

JOURNAL *of the* American Veterinary Medical Association

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The American Veterinary Medical Association

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THE importance of vitamins, minerals and hormones has brought new conceptions into the domain of animal therapeutics to such an extent that correcting deficiencies of them is paramount in the successful practice of veterinary medicine.

The health, growth and resistance to disease as well as the function of reproduction itself cannot be sustained where the normal ratio of these nutritional agencies is abnormal. The revelations of modern therapeutics obligate the clinician to maintain the ratio of vitamins and minerals as near to normal as possible in every patient.

Dietary deficiencies are particularly acute at this time on account of the drouth of last year and, according to widely expressed opinions, the situation is materially affecting not only the health of breeding animals but also the number and viability of their offspring.

Excellent products, effective, economical and practical, by which the veterinarian can augment the prestige of veterinary medicine are available for all animals at our various branches.



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JOURNAL *of the* **American Veterinary Medical Association**

Formerly AMERICAN VETERINARY REVIEW

(Original Official Organ U. S. Vet. Med. Assn.)

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APRIL, 1935

No. 4

IS OUR OWN HOUSE IN ORDER?

In an address before the Chicago Dental Society recently, Dr. Rexford Guy Tugwell, Undersecretary of Agriculture, is quoted as having said:

There is a great vested interest of time, skill and training involved in caring for the health needs of the American people. From some of the views published on the subject I infer that there is a lively apprehension among the health professions.

The above statement was made just a few days ago after the convening of a special meeting of the House of Delegates of the American Medical Association at which the proposal for compulsory sickness insurance, made by President Roosevelt's Committee on Economic Security, was condemned.

The annual Congress on Medical Education, sponsored by the American Medical Association, was held immediately following the meeting of the House of Delegates. Among the papers presented at the Congress was one by Dr. Willard C. Rappleye, dean of Columbia University College of Physicians and Surgeons, on "Larger Social Aspects of Medical Education." Among the statements made by Dr. Rappleye, the one which attracted most attention was his prediction that, in 20 to 50 years, 85 per cent of the medical service in the United States will be rendered by physicians paid by some governmental unit, local, state or federal. At the same time he drew attention to the fact that, on the

average, one physician out of every seven in the United States is now employed on a salary basis.

With so much attention being given to discussions of state medicine by the medical and dental professions, it is perfectly natural for members of the veterinary profession to ponder the question. We have had various forms of state veterinary medicine for fifty years and just now the question is: How far will state veterinary medicine go? Will it be developed and expanded to the point where the private practitioner will be completely erased from the picture, except for those who specialize in small-animal practice in our large cities?

As far as veterinary medicine is concerned, there are fundamental principles involved in state medicine which do not enter into the question from the standpoint of the physician or the dentist. Conversely there are phases of the question which concern these groups which do not concern the veterinarian. Therefore, it does not necessarily follow that what is best as far as medicine or dentistry is concerned is best for veterinary medicine.

No one can be unconscious of the tremendous swing right now to a consideration of all those things which come under the head of social betterment. The period of disturbance from which we now appear to be emerging has brought to light many weaknesses of the old system. It is with a view to repairing these flaws that so much attention is now being devoted to studying conditions and finding remedies. With questions of public health playing so prominent a part, the veterinarian is bound to be affected by any further changes in the present system. The control of animal diseases is so important to agriculture, which in turn is so firmly integrated with the welfare of the nation, that veterinary medicine will be affected by any major reforms that are put into operation as parts of a permanent system.

When and if changes come, they are going to be made with a view to their effect on the mass rather than on the individual or on any group. It is extremely unlikely that the powers that be will go to the medical profession and ask, "What do you prefer?" Or to the dentists and ask, "What do you men want?" Or to the veterinarians and ask, "What are your wishes in the matter?"

There is one thing that we can do, if it is necessary. We can put our own house in order. It may be easier for us to do this than for other groups, businesses or professions. There has been no public criticism of the veterinarian for the way he has rendered his service. On the other hand we have seen one group after another hauled over the coals. We have seen corrective

and restrictive legislation passed to control these groups because they did not put their own houses in order. If it is necessary, it is better that we do this job ourselves than for somebody to do it for us.

EXECUTIVE BOARD ELECTIONS

Executive Board elections are in progress in District 5 (Iowa and Minnesota) and District 7 (Alaska, Hawaii, Idaho, Montana, Nebraska, North Dakota, Oregon, Philippine Islands, South Dakota, Washington and Wyoming). Ballots calling for nominations were mailed to all members in good standing in these two districts on February 27, and many of these ballots already have been returned although quite a number have not.

The two Executive Board elections being held this year may have a peculiar significance for the reason that a proposal is now before the A. V. M. A. to elect the president each year by mail ballot. When this proposal was discussed by the Executive Board at the meeting in New York last summer, one of the first questions asked was, "What percentage of the members vote in the Executive Board elections?"

Observations made during the past twelve years indicate very clearly that a considerable number of members do not go to the trouble to vote, even though all the effort that is necessary in the case of the primary election is to write in the name of a nominee and sign the ballot or, in the case of the election proper, to mark a cross (x) in front of one of the names on the ballot, sign it and mail it.

One of the arguments being used in favor of electing our presidents by mail ballot is that this method will enable all members to vote instead of only those who are able to attend each annual meeting. Therefore, if the majority of our members really favor the mail ballot and if they would like to change from the present method of electing our presidents, one of the best ways to do this, at least as far as the members located in Districts 5 and 7 are concerned, is to vote in the Executive Board elections being held in these districts. The extent to which this privilege is exercised in these elections, as well as the extent to which it has been exercised in previous elections, records of which are available, may have some influence with the members of the House of Representatives when this question comes up for final action at the meeting in Oklahoma City.

The polls for the primary elections will be closed April 27 and ballots for the elections proper will be placed in the mail April 29.

NOT GETTING THE BREAKS

An official connected with a biological manufacturing concern in the East becomes involved in a case in which it is reported that the expiration date on some packages of diphtheria antitoxin had been changed. Much newspaper publicity resulted. The official involved is a veterinarian and was referred to as such in practically every newspaper article published.

A short time later, a veterinarian in California was the subject of press dispatches that made the front page. Dr. W. A. Jaquiss (K. C. V. C. '14), of Hollywood, performed several blood transfusions on a 400-pound African lion that was dangerously ill. In the press dispatches, Dr. Jaquiss was referred to as a specialist in wild animal ailments.

We fail to get the breaks.

MISSISSIPPI AFFILIATES

Another state association has voted to affiliate with the American Veterinary Medical Association. At the annual meeting of the Mississippi Veterinary Medical Association held in Gulfport, January 24, this organization voted to affiliate with the A. V. M. A., under the plan which is now in operation. Provision for having Mississippi represented at the next meeting of the A. V. M. A. House of Representatives at Oklahoma City was made in the election of Dr. R. H. Stewart, of Jackson, as delegate, and Dr. C. B. Cain, of State College, as alternate.

This action leaves only three state associations not affiliated: Arkansas, New Mexico and Wyoming.

APPLICATIONS FOR MEMBERSHIP

(See January, 1935, JOURNAL)

FIRST LISTING

- | | |
|--|---------------------------------------|
| BOLEY, LOYD E. | Burlingame, Kan. |
| D. V. M., Kansas State College, 1932 | |
| Vouchers: C. B. Clement and N. L. Townsend. | |
| BOSTWICK, DAVID C. | Box 922, Ardmore, Okla. |
| D. V. M., McKillip Veterinary College, 1915 | |
| Vouchers: C. H. Fauks and L. J. Allen. | |
| DANKS, A. GORDON | Kansas State College, Manhattan, Kan. |
| B. S., Pennsylvania State College, 1929 | |
| D. V. M., Cornell University, 1933 | |
| Vouchers: Glen R. Dunlap and E. R. Frank. | |
| MAHAFFEY, CLAUD O. | Goltry, Okla. |
| D. V. M., Kansas City Veterinary College, 1917 | |
| Vouchers: C. H. Fauks and W. L. Hiatt. | |

- PEARCE, GRACE Marshall Browning Hospital Laboratory, Du Quoin, Ill.
D. V. M., McKillip Veterinary College, 1916
Vouchers: Geo. B. McKillip and L. A. Merillat.
- PEARSON, CHARLES C. 217 E. Sandusky St., Findlay, Ohio
D. V. M., Ohio State University, 1934
Vouchers: W. F. Guard and J. H. Knapp.
- THAYER, LESLIE F. c/o General Delivery, New Cumberland, W. Va.
D. V. M., Michigan State College, 1934
Vouchers: Edw. K. Sales and H. M. Newton.
- WHITMAN, JAMES R. c/o Dr. L. J. Allen, 334 Federal Bldg., Oklahoma City, Okla.
D. V. M., Kansas State College, 1934
Vouchers: Roy T. Fisher and L. J. Allen.

Applications Pending

SECOND LISTING

(See March, 1935, JOURNAL)

- Bolton, Ray B., Cabot, Vt.
Donaghue, Joseph A., Box 816, Los Banos, Calif.
Duncan, Charles E., 23 Mather St., Binghamton, N. Y.
Hapenny, James E., 8572 W. Pico Blvd., Los Angeles, Calif.
Hummer, Robert L., 312 W. Church Ave., Knoxville, Tenn.
Johnson, Walter M., Adell, Wis.
Leonard, John L., 2564 Steinway St., Astoria, Long Island, N. Y.
Onstad, W. T., Clarkfield, Minn.

The amount which should accompany an application filed this month is \$8.75 which covers membership fee and dues to January 1, 1935, including subscription to the JOURNAL.

COMING VETERINARY MEETINGS

- New York City, Veterinary Medical Association of. Hotel New Yorker, 8th Ave. and 34th St., New York, N. Y. April 3, 1935.
Dr. R. S. MacKellar, Jr., Secretary, 329 W. 12th St., New York, N. Y.
- American Animal Hospital Association. Palmer House, Chicago, Ill. April 3-4, 1935. Dr. A. R. Theobald, Secretary, 4545 Reading Road, Cincinnati, Ohio.
- Houston Veterinary Association. Houston, Texas. April 4, 1935.
Dr. W. T. Hufnall, Secretary, 1612 E. Alabama Ave., Houston, Texas.
- Ak-Sar-Ben Veterinary Medical Association. Elks Building, Omaha, Nebr. April 8, 1935. Dr. J. N. McIlroy, Secretary, 3251 Leavenworth St., Omaha, Nebr.
- Chicago Veterinary Medical Association. Palmer House, Chicago, Ill. April 9, 1935. Dr. O. Norling-Christensen, Secretary, 1904 W. North Ave., Chicago, Ill.

- San Diego County Veterinary Medical Association. San Diego, Calif. April 9, 1935. Dr. L. K. Knighton, Secretary, 3438 Mountain View, San Diego, Calif.
- Southeastern Michigan Veterinary Medical Association. Detroit, Mich. April 10, 1935. Dr. A. S. Schlingman, Secretary, Parke, Davis & Co., Detroit, Mich.
- Tulsa County Veterinary Association. Tulsa, Okla. April 11, 1935. Dr. J. M. Higgins, Secretary, 3305 E. 11th St., Tulsa, Okla.
- Kansas City Veterinary Association. Baltimore Hotel, Kansas City, Mo. April 16, 1935. Dr. C. C. Foulk, Secretary, 1103 E. 47th St., Kansas City, Mo.
- Southern California Veterinary Medical Association. Chamber of Commerce Bldg., Los Angeles, Calif. April 17, 1935. Dr. T. G. Beard, Secretary, 3684 Beverly Blvd., Los Angeles, Calif.
- Keystone Veterinary Medical Association. Philadelphia, Pa. April 24, 1935. Dr. C. S. Rockwell, Secretary, 5225 Spruce St., Philadelphia, Pa.
- Ohio Live Stock Prevention Association. Wooster, Ohio. April 25, 1935. Mr. Earle G. Reed, Secretary, 370 W. Broad St., Columbus, Ohio.
- Connecticut Veterinary Medical Association. West Hartford, Conn. May 1, 1935. Dr. Edwin Laitinen, Secretary, 993 N. Main St., West Hartford, Conn.
- Hudson Valley Veterinary Medical Society. U. S. Military Academy, West Point, N. Y. May 8, 1935. Dr. J. G. Wills, Secretary, Box 751, Albany, N. Y.
- Michigan-Ohio Veterinary Medical Association. Blissfield, Mich. May 9, 1935. Dr. E. C. W. Schubel, Secretary, Blissfield, Mich.
- New York State Veterinary Medical Society. Binghamton, N. Y. June 13-14, 1935. Dr. F. F. Fehr, Secretary, 243 S. Elmwood Ave., Buffalo, N. Y.
- Eastern Iowa Veterinary Association, Inc. Mechanicsville, Iowa. June 18, 1935. Dr. John J. Strandberg, Secretary, 1005—8th Ave., Belle Plaine, Iowa.
- Northwest Veterinary Medical Association. (Joint meeting of the Oregon, Washington and British Columbia Veterinary Medical Associations.) Victoria, B. C. July 8-10, 1935. Dr. W. Graham Gillam, Secretary, Cloverdale, B. C.
- American Veterinary Medical Association. Oklahoma City, Okla. August 27-30, 1935. Dr. H. Preston Hoskins, Secretary, 221 N. La Salle St., Chicago, Ill.

USE OF ELEVATED WIRE FLOORS IN CONTROLLING LUNGWORM INFESTATION IN FOXES*

By KARL B. HANSON† and W. G. McBLAIN, JR.‡

U. S. Fur Animal Experiment Station, Division of Fur Resources
Bureau of Biological Survey, U. S. Department of Agriculture
Saratoga Springs, N. Y.

INTRODUCTION

Lungworm infestation is one of the most important diseases of ranch-raised foxes, resulting not only in a detrimental effect on the quality of the pelt and on the health, growth and breeding performance of the seriously affected animals, but also in some deaths. Heavy infestations commonly result in failure to shed properly and oftentimes in a short, broken and hookedlike or singed, condition of the guard hairs in animals that otherwise produce normally excellent pelts. Although the ravages of this parasitic disease usually are more pronounced in pups, adults also are affected.

Two species of lungworms are encountered in ranch-raised foxes: *Eucoleus aerophilus* (Creplin, 1839) and *Crenosoma vulpis* (Creplin, 1847). *Eucoleus* is prevalent on fox farms throughout the eastern and central parts of this country and Canada, but *Crenosoma* appears on only a few farms.

EXPERIMENTAL METHODS AND DATA

To determine the efficacy of confinement on raised, wire floors in the prevention of lungworms in pups, three vixens at the United States Fur Animal Experiment Station were moved shortly after mating (February, 1932) to elevated, wire-floored pens and allowed to whelp and rear their young in such pens. The inside dimensions of these pens, which were provided with houses and nest-boxes, were approximately 16x6x6 feet. The type of netting used for the floors was 1-inch hexagonal mesh No. 16 steel wire, galvanized after weaving.§ The pens were placed in a well-shaded area. Other vixens, used as controls, were allowed to whelp and rear their young in the regular breeding pens, on a silt loam soil.

The droppings were picked thoroughly each day in the breeding-pens and in the houses of both the breeding-pens and those

*Received for publication, April 25, 1934.

†Biologist in charge.

‡Junior biologist, assistant.

§The Bureau of Biological Survey has available, to those interested, reproductions of working drawings of the pens used in the experiments covered by this article.

with the raised, wire floors. Because the elevated, wire-floored pens were practically self-cleaning, it was necessary to go into them only occasionally to remove pellets of manure that were too large to pass through the 1-inch meshes of the floor netting.

Pups that developed serious cases of lungworm trouble in the regular breeding-pens at eight to twelve weeks of age were moved promptly to raised, wire floors. These animals were placed in the same pens with pups that had been born on elevated, wire floors.

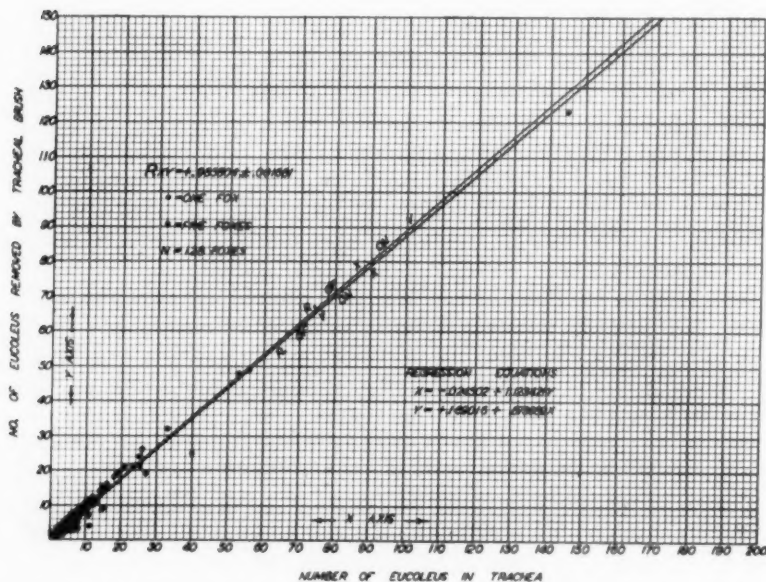


FIG. 1. Correlation between the number of *Eucolus acrophilus* in the trachea and the number removed by treatment with a tracheal brush.

Since none of the pups born and reared on the wire showed evidence of becoming infested with lungworms, nine of them were moved to the regular breeding pens on August 16. This was done to see how soon and how extensively they would become infested. At the same time several of the pups that had been born in the regular breeding-pens and had developed mild or moderate infestations were moved to elevated, wire floors and kept there until pelting season.

Subsequent to June 10, all pups with the exceptions of 494 and 510, two animals showing pronounced symptoms of heavy infestation with lungworms, were treated at intervals with a tracheal

brush and counts made of the number of lungworms removed from each animal at each treatment. Recently Hanson¹ called attention to the fact that the tracheal brush is of value in the diagnosis of *Eucoleus* infestation in foxes. He stated also that there appeared to be a positive correlation between the number of specimens removed by treatment with this instrument and the number present in the trachea, bronchi and bronchioles. Figures 1 and 2 are scatter diagrams showing the nature of the correlations between the number of *Eucoleus* removed by the instrument and the following: (1) The number present in the trachea;

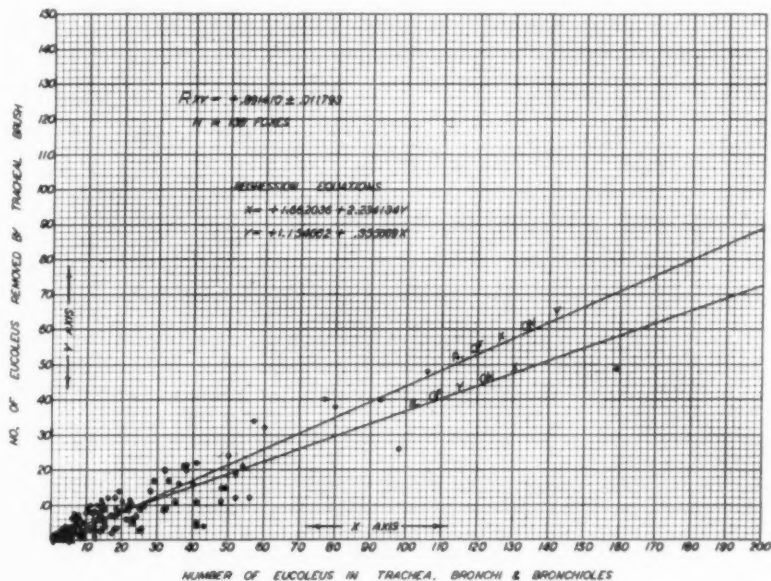


FIG. 2. Correlation between the number of *Eucoleus acrophilus* in the trachea, bronchi and bronchioles and the number removed by treatment with a tracheal brush.

(2) the total number present in the trachea, bronchi and bronchioles. The correlation in figure 1 is based on 128 animals and in figure 2 on 138 animals. In each of these two instances the correlation coefficient is both strong and significant. It was $+0.986 \pm 0.002$ in the first case and $+0.891 \pm 0.002$ in the second. These data indicate that counts of the number of specimens removed by the tracheal brush give a fairly good estimate of the extent of *Eucoleus* infestation in a given fox at the time of treatment. This is especially true if the relative size of the worms removed, the interval between successive treatments, and the results of previous passages of the instrument on the same

TABLE I—Data pertaining to pups born and reared in elevated, wire-floored pens.

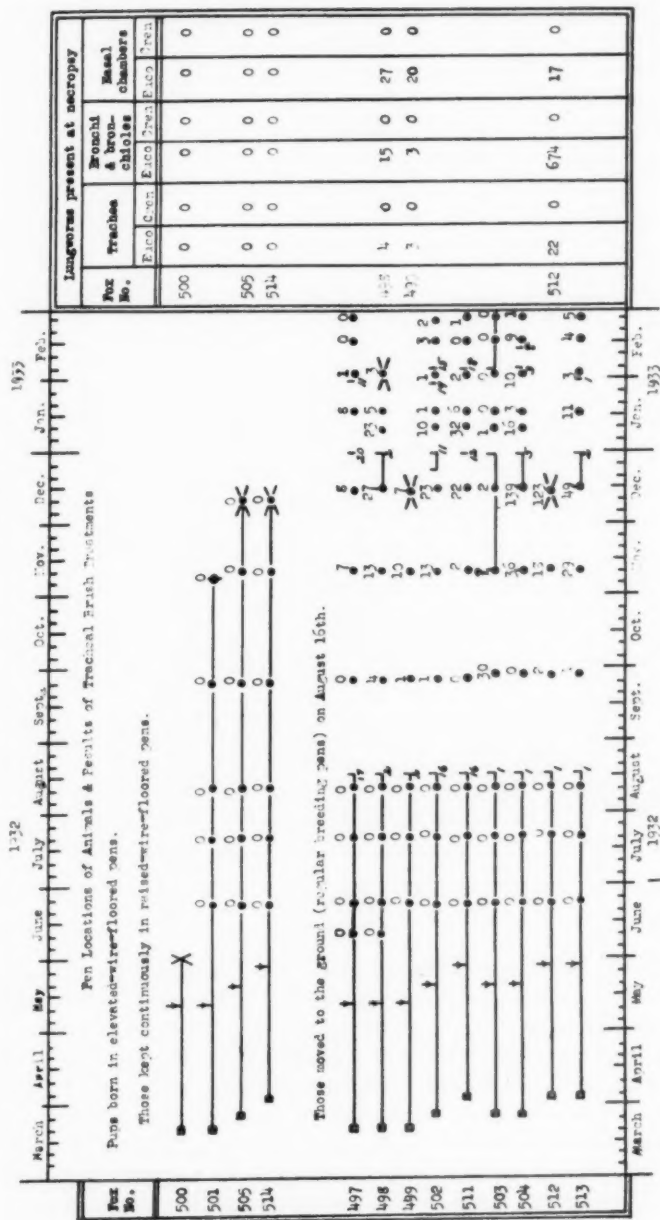


TABLE II.—Data pertaining to pups born and kept continuously in earth-bottomed breeding-pens until late in the fall.

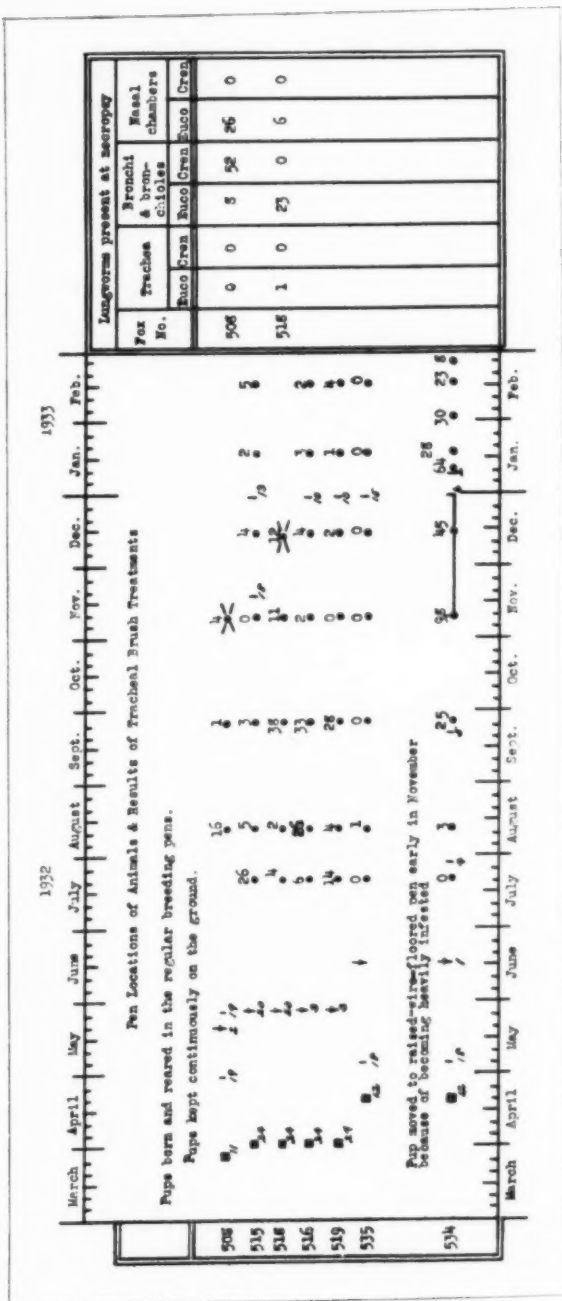


TABLE III.—Data pertaining to pups born in earth-bottomed breeding-pens and moved to elevated, wire-floored pens at weaning time or shortly thereafter, because of developing pronounced symptoms of heavy infestation with lungworms.

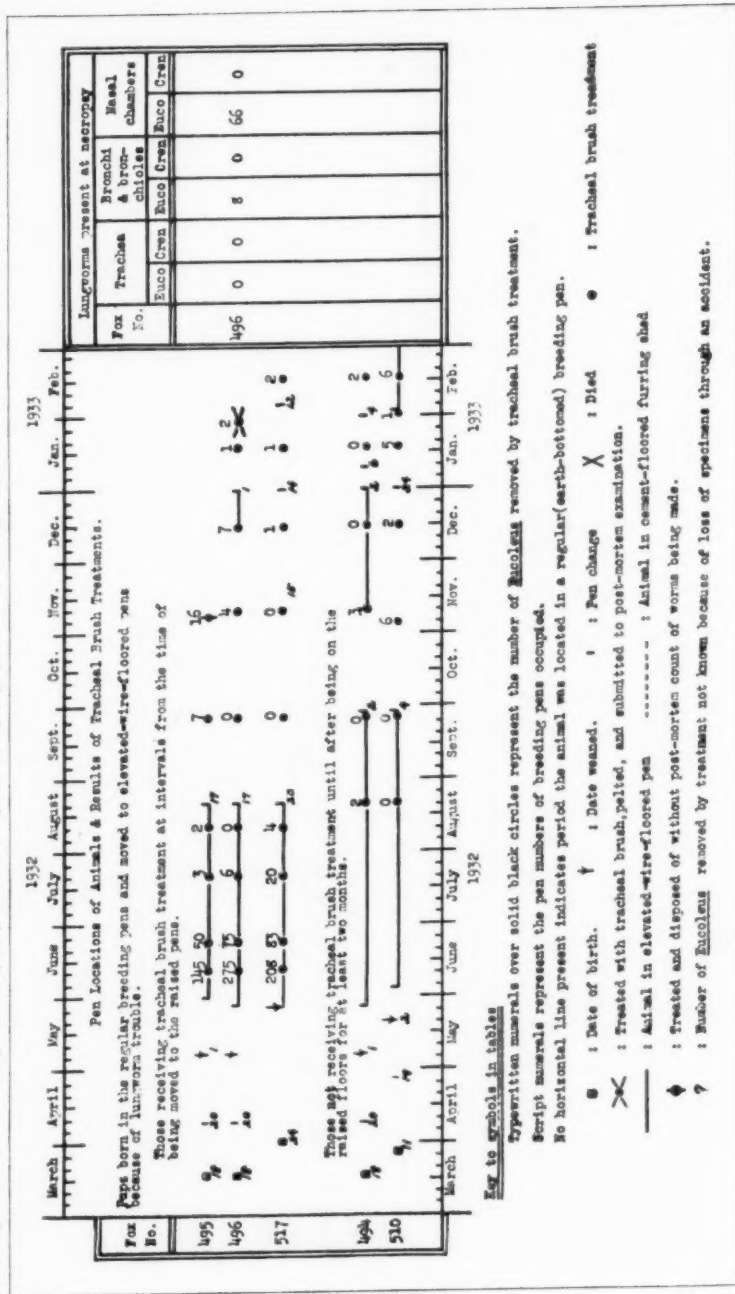
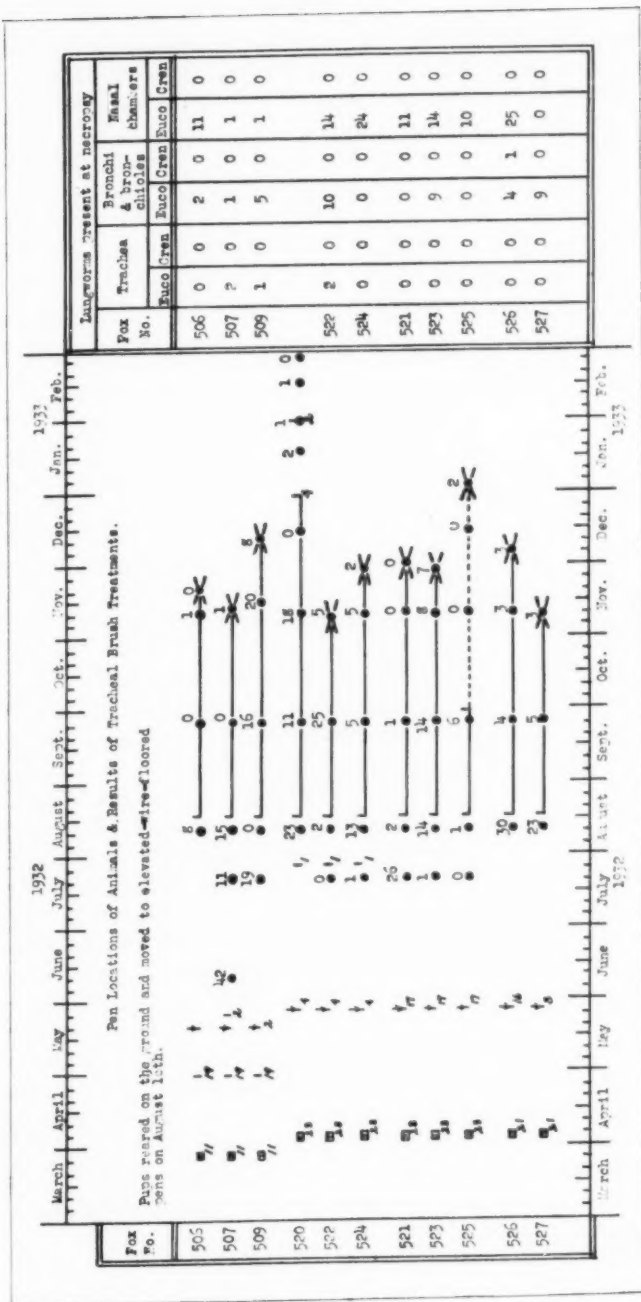


TABLE IV—Data pertaining to pups born and reared in earth-bottomed breeding-pens but kept in elevated, wire-floored pens from the middle of August until pelting season.



individual animal are given proper consideration. A detailed account of the dates of treatment, the number of *Eucoleus* removed at each treatment, and certain other incidental information are given in tables I to IV.

Those pups disposed of during pelting season were killed by electrocution under ether anesthesia and promptly submitted to a postmortem examination to determine the number of *Eucoleus* and *Crenosoma* present in the following three regions: (1) trachea, (2) bronchi and bronchioles. (3) nasal chambers. The findings of these examinations also are given in tables I, II, III and IV.

Hanson¹ has previously described the method of treatment and the method of collecting the worms pursued in this work.

DISCUSSION OF RESULTS

None of the 13 pups born and reared on raised, wire floors showed evidence of becoming infested with *Eucoleus* while they were kept on such floors. This was despite the fact that they were kept in the same pens with some very heavily infested animals. In contrast to this, practically all the 23 pups born and reared in the regular breeding-pens became infested, some of them developing very heavy infestations.

Fox 500, which was born and reared on the wire, died of acute indigestion on June 1. At necropsy a few ascarids were present in the duodenum. No hookworms or lungworms were found.

During June, July and August, 38 treatments were administered to the 13 pups born and reared on the raised, wire floors. The total number of *Eucoleus* removed by these treatments was zero. During the same period, 46 treatments were given the 23 pups born in the regular breeding pens. The total number of *Eucoleus* removed was 1,211. It is quite probable that this total would have been much larger if treatment of foxes 494 and 510 had not been deferred purposely until after these two animals had shown marked improvement. Both of these pups had bad cases of lungworm trouble.

All three pups born on the wire and kept there continuously until pelting time remained free of lungworms. A total of eight treatments were administered to these animals after August; the number of lungworms removed was zero. Two of these pups were pelted and submitted to a postmortem examination. The results obtained in both cases were negative for lungworms at necropsy.

All nine of the pups born on wire and moved to the ground on August 16 soon became infested with lungworms. Six of these

showed tracheal infestation with *Eucoleus* when treated six weeks after being moved to the ground. In all, 58 treatments were administered to these animals between August 16 and March 1, during which period more than 728 lungworms were removed. Three of these nine animals were pelted. The total number of lungworms found in them at necropsy consisted of 785 *Eucoleus*. Of the 1,513 *Eucoleus* encountered in all nine animals, 1,352 were recovered through treatments and necropsies up to the middle of December, by which time a disposition had been made of the three pups that had been kept continuously on wire since birth.

There was noted a general tendency for the number of *Eucoleus* removed by treatment to decrease in accordance with the length of time the animals had been on wire at the time of treatment. This and the fact that specimens were removed by successive treatments after the animals were moved to the wire indicate that *Eucoleus* undoubtedly migrate from the lungs to the trachea. The fact that only a few lungworms were removed by the treatment of foxes 494 and 510, both of which had had cases of lungworm trouble but which purposely were left untreated until after they had been on the wire for at least two months, indicates that specimens of *Eucoleus* probably stay in the trachea for only a limited period. The results encountered in these two animals indicate that confinement on raised, wire floors is of value in the treatment of infested foxes. Since 66 *Eucoleus* were encountered in the nasal chambers of fox 496, the indications are that specimens of this parasite after leaving the trachea apparently migrate to the nasal chambers. From this, one would be led to infer that it is advisable to keep foxes on elevated, wire floors for a considerable period after they recover from symptoms of lungworm trouble.

In the infested pups treated periodically there was noted a general tendency for the number of *Eucoleus* removed by treatment to reach a peak, either slowly or suddenly, and then gradually to diminish until it became more or less negligible. This appeared to be true regardless of whether the infested animals were left on the ground or moved to elevated, wire floors. Studies carried out in different experiments than the ones covered in this paper indicate that this gradual decrease in the extent of *Eucoleus* infestation apparently is due largely to the development of an active immunity resulting from infestation.

Only two of the animals were found to be infested with *Crenosoma*. Fox 508 had 52 present in the bronchi and bronchioles and fox 526 had only one. Both animals were born and reared in

the regular breeding pens. Fox 526, however, was moved to the wire floor on August 16.

No trouble with killing, or "lugging," of pups was encountered in the three vixens moved to the raised, wire floors shortly after mating. All three of these animals were proved producers and known to be mothers not inclined to kill or carry pups. Moreover, precaution was taken to have the houses in which these females whelped their young located 30 feet or more apart.

The animals born and reared on the wire grew as well and developed as good fur as those in the regular breeding-pens.

When the pups became eight weeks old, the age at which they were weaned and separated from their mothers, the number kept in each of the elevated, wire-floored pens was limited to not more than four. This was about as many as could be accommodated satisfactorily by a raised pen having a floor measuring 16x6 feet.

One important advantage of elevated, wire-floored pens over the regular breeding-pens was that considerably less labor was required in keeping them clean. This, together with their efficaciousness in the prevention and control of lungworm infestation, indicates that the elevated, wire floors give promise of becoming of practical value on fox farms that are seriously troubled with lungworms.

SUMMARY AND CONCLUSIONS

Confinement of foxes on elevated, wire floors is effective in preventing lungworm infestation. It is of value also in treating infested animals.

Moving known, good mothers to elevated, wire floors shortly after mating and having them rear their pups in such pens appears to be safe and effective in preventing lungworm infestation in the pups.

Pups born and reared on elevated, wire floors remain free of lungworms while they are kept on such floors. They soon acquire infestation, however, upon being moved to infested ground. This occurs even though the pups may be four months or more of age when moved from the wire.

Elevated, wire-floored pens of sufficient size and proper design give promise of attaining extensive commercial application on ranches where lungworm trouble is a relatively serious problem.

ACKNOWLEDGMENT

The authors wish to acknowledge their indebtedness to Joseph Mihalek, Jr., of the United States Fur Experiment Station, for

assistance in collecting worms from tracheal brushes and carcasses.

ADDENDUM

In other experiments performed subsequently to the ones covered in the foregoing article, it has been demonstrated that elevated, wire-floored pens are highly effective also in the prevention of infestations with *Uncinaria stenocephala* and *Capillaria plica*, that fox pups usually do not become infested with these two parasites and lungworms until they leave their dens and run on infested ground, and that lungworm, hookworm and bladderworm infestation in fox pups can be prevented effectively even when the latter are not moved to the elevated pens until they are four or five weeks of age.

REFERENCE

¹Hanson, K. B.: Test of the efficacy of single treatments with tracheal brushes in the mechanical removal of lungworms from foxes. Jour. A. V. M. A., lxxxii (1933) n. s. 35 (1), pp. 12-31.

Special Session of A. P. H. A. Meeting for Veterinarians

The Laboratory Section of the American Public Health Association is arranging a special session on public health problems that are of interest to veterinarians, in connection with the 64th annual meeting of the A. P. H. A., which will be held in Milwaukee, Wis., October 7-10, 1935. The program for the special session is being prepared by a committee of veterinarians who are members of the Laboratory Section of the A. P. H. A.: Drs. R. V. Stone (San Fran. '17), of the Los Angeles County Health Department; A. L. McNabb (Ont. '23), of the Department of Health, Toronto, Ont., and I. A. Merchant (Colo. '24), of Iowa State College, Ames, Iowa.

Besides the Laboratory Section, there are nine other sections of the Association: Health Officers; Vital Statistics; Public Health Engineering; Industrial Hygiene; Food and Nutrition; Child Hygiene; Public Health Education; Public Health Nursing; and Epidemiology.

Several related organizations have announced that they will meet simultaneously with the A. P. H. A. at Milwaukee. They are: American Association of School Physicians; International Association of Dairy and Milk Inspectors; Conference of State Sanitary Engineers; International Society of Medical Officers of Health; Association of Dairy, Food and Drug Officials; Conference of Wisconsin Health Officers; Conference of State Laboratory Directors; Association of Women in Public Health.

AVAILABLE METHODS FOR EXAMINATION OF THE BLOOD OF THE FOWL*

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As a preliminary investigation to the study of the blood of the domestic chicken, it was necessary to select a suitable technic for the enumeration of cellular elements and the measurement of hemoglobin. The results of this investigation seem to be of sufficient interest to justify a report of the comparative study. The available literature contains no report in which the various methods recommended for the examination of fowl's blood have been studied in a comparative manner. Various investigators have reported studies concerning the effect of varying physiologic and pathologic influences on the blood cells and hemoglobin. Methods followed in the examination of blood have varied with the various investigators.

The essential difference between mammalian blood and blood of the fowl, which precludes the adoption of the standard methods used for mammalian blood, is that in fowl's blood all cells are nucleated. There are three types of cells to be classified in the circulating blood of the fowl: erythrocytes, leukocytes, and thrombocytes. The major problem in enumerating the cellular elements of such blood is the counting of leukocytes and thrombocytes. One error associated with all methods is introduced in the small number of cells actually counted. The size of the sample cannot be increased without also increasing the number of erythrocytes and rendering counting impossible. An error in the estimation of hemoglobin of the fowl by the measurement of acid hematin has been demonstrated by Dukes and Schwarte.¹ This error is apparently due to the fact that the cells are nucleated.

In this study the available methods were tried, and those which seemed to be more practicable were subjected to comparative study. The methods were applied as recommended, with certain minor modifications which will be noted later. The specimens of blood were obtained by puncture of a vein in the wing with a sharp-pointed instrument, and samples were secured from the free-flowing blood. With the assistance of Dr. Joseph Berkson, Department of Statistics, The Mayo Clinic, the data were subjected to statistical analysis.

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CELLULAR ENUMERATION

Kleineberger,² using isotonic sodium chloride solution as a diluent, recommended the counting of all cells in the counting chamber, then calculating their respective values from the ratios of these cells found in stained blood-smears. It is obvious that the errors associated with this technic would not justify the laborious task of securing blood-counts by this method. Fritsch³ thought the process unjustified and discarded his results. Solutions used by investigators reporting erythrocyte counts are Hayem's, Tyrode's, and others to be mentioned in more detail.

The following methods for counting leukocytes are directed toward differential staining of the leukocytes so that they may be counted in the counting chamber.

The Blain⁴ method utilized two solutions, one of which, solution 1, contains one part of neutral red and 5,000 parts of Locke's solution. Solution 2 contains 12 per cent formalin and 88 per cent Locke's solution. Both solutions are adjusted to pH 7.4 and kept at a temperature of 39° C. while in use. The blood-pipet, after the sample of blood is measured, is half filled with solution 1, shaken for about 15 seconds, and then filled with solution 2. Neutral red is taken up by the leukocytes, making them distinguishable from erythrocytes; a direct count is made.

Coates⁵ recommended the following thrombocyte-counting solutions of Wright and Kinnicut for counting the leukocytes of the fowl: solution 1 contains 1 gm of brilliant cresyl blue in 300 cc of distilled water, and solution 2 contains 1 gm of potassium cyanide in 1,400 cc of distilled water. Equal parts of solutions 1 and 2 are mixed and filtered immediately before using. In subdued light, the leukocytes are said to refract the light in such a manner as to render direct counting possible. In trials made with this method the distinction was not satisfactory.

A 2 per cent solution of osmic acid was recommended by Kyes⁶ and was used by Doan, Cunningham, and Sabin⁷ as a diluting solution for the direct counting of leukocytes.

Forkner, using a diluting fluid of 25 mg of neutral red in 100 cc of 0.9 per cent sodium chloride solution, differentiated polymorphonuclear granulocytic cells and the monocytes, and made a direct count of these elements in the counting chamber. A differential count was made from a blood-smear. The total leukocyte count was then calculated. He stated that temperature and pH of the fluid are not essential factors if maintained within reasonable limits.

Shaw's⁸ method is a direct count of erythrocytes, leukocytes and thrombocytes. These cells are differentiated by their reac-

tions in the diluting fluid. Solution 1 contains 25 mg of neutral red (Grübler) and 0.9 gm of sodium chloride in 100 cc of distilled water. Solution 2 contains 12 mg of crystal violet (Grübler), 3.8 gm of sodium citrate, 0.4 cc of formaldehyde, and 100 cc of distilled water. Both solutions are filtered and heated to 107° F. for use; the pipet is half filled with solution 1 and then filled with solution 2.

Wiseman⁹ suggested a method by which the polymorphonuclear pseudo-eosinophils and eosinophils are stained with the dye, phloxine. These cells are counted in the counting chamber and the total leukocyte count is obtained by calculation from the percentage of these cells in the differential count. Wiseman recommended that the filled pipet be allowed to stand several hours, to obtain maximal staining of the cells. In this investigation it was found advantageous to leave the pipet over night before counting. The diluting fluid contains 50 mg of phloxine, 5 cc of formalin and 95 cc of Ringer's solution. The erythrocytes are well fixed with this solution. In conjunction with the Wiseman technic an estimation of the thrombocytes per cubic millimeter of blood is made by counting the number of thrombocytes observed in the blood-smear per 100 or 200 leukocytes, then, when the total number of leukocytes has been calculated, the number of thrombocytes may be calculated from the ratio found.

Toisson's solution has been employed by several investigators as a diluent for the counting of erythrocytes and leukocytes. The solution used contains 1 gm of sodium chloride, 8 gm of sodium sulfate, 30 cc of glycerin, and 160 cc of distilled water. Sufficient methyl violet (5B) to give a strong purple color is added.

COMPARATIVE STUDY

Two studies were done for the purpose of comparing methods recommended for the counting of blood-cells. The variability of the various methods themselves was first investigated. In later studies a comparison of the counts, from the same blood, by the various methods was obtained. The methods employed in the study were those of Blain, Shaw, Forkner,¹⁰ Wiseman, and that utilizing Toisson's solution.

The osmic acid method of Kyes was attempted. This method was not included in the study because of the danger of injury to the cornea of the eye by fumes of osmic acid, and also because no particular advantages were apparent in the trials made.

The counts were all made with a magnification of $\times 440$ in order to reduce to a minimum the possible confusion of erythrocytes, leukocytes and thrombocytes in the counting chamber.

The method employing Toisson's solution was the most satisfactory of the direct methods in differentiating leukocytes.

The Shaw diluent revealed no more marked distinction of the thrombocytes than Blain's or Toisson's solution. The staining of monocytes and polymorphonuclear granulocytes in the Forkner solution and of polymorphonuclear acidophilic granulocytes in the Wiseman solution was quite distinctive.

The accuracy of the individual methods was determined by applying each of them ten times to samples of blood of each of three different chickens. Five of the ten preparations were made and the cells counted by each of two individuals, to observe possible varying results in the methods as applied by different technicians. The counts were made as soon as possible after obtaining the samples, except with the Wiseman solution. A differential count of 100 cells was done with the indirect methods, and the smear was taken at approximately the same time as the corresponding pipet was filled. All chickens were apparently healthy and normal.

There was no marked difference between the results obtained by the two technicians for any of the methods applied. Using the coefficient of variation as a measure of variability, the smaller this coefficient of variation the more consistent are the results, hence this may be used as an index of accuracy.

The Wiseman technic has the lowest coefficient of variation (4.9 per cent) in erythrocyte counts and is to be regarded as the most consistent in results. The Forkner method, having the highest coefficient of variation, would be the least consistent (table I).

The Blain technic and the Toisson solution method yield the lowest coefficients of variation in the leukocyte counts and thus are the most consistent.

The Shaw method of counting thrombocytes is apparently capable of yielding more consistent results than that used in conjunction with the Wiseman technic.

The comparison to evaluate the methods from the standpoint of accuracy of measuring both the erythrocytes and leukocytes may be made by arranging them in an order in which the numeral 1 indicates the method of most consistent results and numeral 5 that of least consistent results. According to such an arrangement, then, the method of Blain was 2 for erythrocytes, and 1 for leukocytes; that of Shaw, 3 for erythrocytes and 4 for leukocytes; that of Toisson, 4 for erythrocytes and 2 for leukocytes; that of Forkner, 5 for erythrocytes and 5 for leuko-

cytes; and that of Wiseman, 1 for erythrocytes and 3 for leukocytes. It is apparent from the standpoint of combined counts that the Blain method is preferable. This preference is followed in order by the Wiseman, Toisson, Shaw, and Forkner methods.

In the second series of counts, in which the various methods were applied to the same specimen of blood, the leukocyte content of the blood was varied by the use of two normal chickens, two chickens with high leukocyte counts, and one chicken with erythroleukosis. Only one bird was used at a time. Two counts by each method were made from the blood and the results of these were averaged to represent that method. It must be borne in mind in the analysis of such data that there is no recognized standard method that will serve for comparison.

TABLE I—Accuracy of counting methods.

METHOD	SERIES	ERYTHROCYTES		LEUKOCYTES		THROMBOCYTES	
		STANDARD DEVIATION (IN MILLIONS)	COEFFICIENT OF VARIATION (%)	STANDARD DEVIATION (IN THOUSANDS)	COEFFICIENT OF VARIATION (%)	STANDARD DEVIATION (IN THOUSANDS)	COEFFICIENT OF VARIATION (%)
I Blain	1*	0.16	5.2	3.2	14.0	.....	.....
	2	0.19	5.2	1.6	10.3	.....	.....
	3	0.37	11.3	1.8	20.0	.....	.....
	Mean	0.24	7.2	2.2	14.4	.....	.....
II Shaw	1	0.30	10.3	2.5	20.0	3.4	10.1
	2	0.21	8.0	4.8	18.5	4.9	22.5
	3	0.24	10.3	5.5	47.0	5.3	33.8
	Mean	0.25	9.2	4.3	28.5	4.5	22.1
III Toisson	1	0.37	12.7	3.7	27.2	.....	.....
	2	0.24	8.5	4.0	11.8	.....	.....
	3	0.35	10.7	1.4	5.6	.....	.....
	Mean	0.32	10.6	3.0	14.8	.....	.....
IV Forkner	1	0.19	7.2	10.8	42.5	.....	.....
	2	0.37	12.6	8.4	27.5	.....	.....
	3	0.40	13.7	4.6	22.7	.....	.....
	Mean	0.32	11.1	7.9	30.9	.....	.....
V Wiseman	1	0.16	5.3	3.5	22.0	4.7	32.1
	2	0.14	4.7	4.1	21.5	6.3	24.3
	3	0.15	4.8	6.5	26.2	11.8	41.4
	Mean	0.15	4.9	4.7	23.2	7.6	32.6

*Each series represents ten specimens taken from the same bird at the same time. The counts by different methods are not necessarily on the same bird.

The erythrocyte values found by the various methods do not vary greatly in excess of what would be expected with consecutive counts by any one method alone. The leukocyte values, however, do indicate discrepancies between the various technics (table IIa).

The Wiseman technic tends to give slightly higher erythrocyte values. This is true also of the leukocyte counts when the counts on the bird with erythroleukosis are not considered (table IIb).

The Blain method reveals a distinct tendency to give a lower leukocyte count than the others. It is worthy of note that the Blain method also gave the most consistent leukocyte count in the first study. The fact that the counts were always lower may indicate that some group of leukocytes is not being stained and counted by this method. This might account also for the coefficient of variation being the lowest.

The thrombocyte counts obtained by the Shaw method were consistently higher than those determined by the Wiseman technic.

An explanation for the tendency of the Wiseman method to give higher erythrocyte and leukocyte values is lacking. The erythrocytes are fixed and more distinctly stained than with the other methods. The specificity of the staining has been demonstrated by the use of the method on various samples of blood revealing high percentages of either of the two series of acidophilic granulocytes.

TABLE IIa—Direct comparison of counts by various methods. (Results obtained in number of cells per cmm of blood.)

COUNT	METHOD	CHICKEN				
		A	B	C	D	E*
Erythrocytes (in millions)	I. Blain	3.46	2.42	3.35	2.64	1.66
	II. Shaw	3.18	2.63	3.55	3.19	1.54
	III. Toisson	3.18	2.72	3.76	2.66	1.45
	IV. Forkner	3.17	2.47	3.42	2.75	1.50
	V. Wiseman	3.66	2.82	3.01	3.00	1.95
Leukocytes (in thousands)	I. Blain	8.10	47.10	11.30	35.40	.....
	II. Shaw	9.70	67.00	18.40	36.30	53.70
	III. Toisson	10.90	69.40	23.30	45.50	70.50
	IV. Forkner	7.90	61.40	23.60	54.10	18.50
	V. Wiseman	16.00	56.20	25.50	55.70	22.10
Thrombocytes (in thousands)	II. Shaw	32.80	65.50	32.30	50.30	9.20
	V. Wiseman	31.40	59.80	28.30	38.30	3.00

*Erythroleukosis.

All direct methods of counting leukocytes failed with pathologic blood of the erythroleukotic chicken. The erythrocyte counts by the various methods were based on a selection of mature, normal-appearing cells. The immature erythrocytes are confused with leukocytes in the counting chamber, and thus a direct leukocyte count is impossible. The hemoglobin-bearing cells are stained by the phloxine dye diluting solution in a characteristic manner even though they are not fully developed or normally shaped. The acidophilic granulocytes may be counted in the counting chamber after being stained with phloxine. The immature erythrocytes and leukocytes can readily be distinguished in the blood-smear, and thus a more nearly correct count of leukocytes may be obtained.

MEASUREMENT OF HEMOGLOBIN

The methods most commonly used for the measurement of hemoglobin of the chicken are those of Sahli, Newcomer, and Dare. There have been different values reported as normal by investigators using hemoglobinometers. One fact to be borne in mind is that these instruments have been designed primarily for the measurement of the hemoglobin of man.

Dukes and Schwarte felt that the hemoglobin readings obtained with the Newcomer instrument on chickens' blood were high, due to the turbidity of the acid hematin solution. They have given a factor of correction for this turbidity. The correction is expressed:

$$\text{Corrected reading} = 0.91 (\text{uncorrected reading}) - 1.49$$

TABLE IIb—*Direct comparison of counts by various methods. (Ordering of results on basis of 1 to 5, 1 being lowest value, 5 the highest.)*

COUNT	METHOD	CHICKEN				
		A	B	C	D	E*
Erythrocytes	I. Blain	4	1	2	1	4
	II. Shaw	1	2	3	3	2
	III. Toisson	3	4	5	2	1
	IV. Forkner	2	3	4	5	3
	V. Wiseman	5	5	1	4	5
Leukocytes	I. Blain	2	1	1	1	..
	II. Shaw	3	4	2	2	3
	III. Toisson	4	5	3	3	4
	IV. Forkner	1	3	4	4	1
	V. Wiseman	5	2	5	5	2
Thrombocytes	II. Shaw	2	2	2	2	2
	V. Wiseman	1	1	1	1	1

*Erythroleukosis.

The percentage reading of the instrument must first be translated into grams per 100 cc before the equation for correction is applied. This correction factor line is plotted in figure 1.

In brief, the principles of the various methods of determining hemoglobin are as follows: The Tallqvist hemoglobinometer consists of a book of small sheets of absorbent paper and a printed scale of colors. This scale of colors was adjusted to the readings of the von Fleischl hemoglobinometer. On the Tallqvist scale, 100 per cent approximates 14 gm of hemoglobin per 100 cc

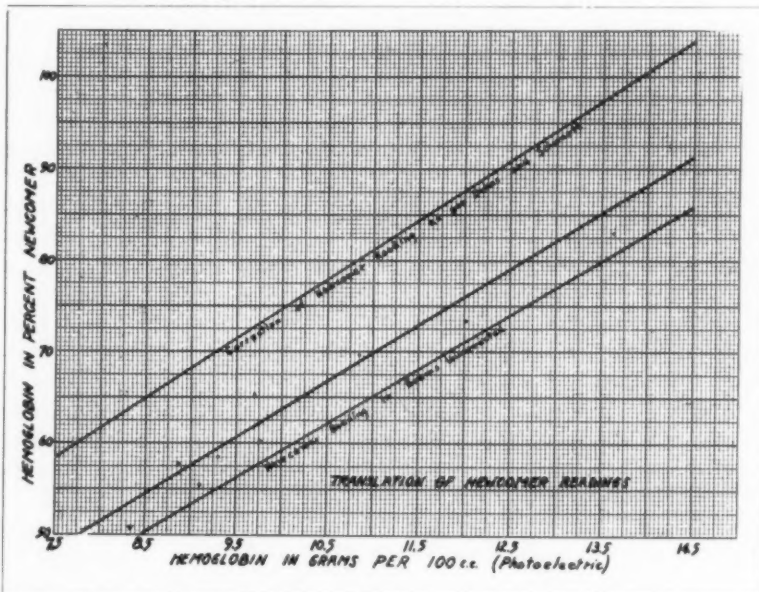


FIG. 1. The relationship between hemoglobin readings of the Newcomer and photo-electric instruments on similar samples of chickens' blood. Each point represents the mean of ten readings by each instrument. For comparison, a line is drawn indicating the conversion of percentage Newcomer readings into grams of hemoglobin per 100 cc of blood, and another line represents the correction of these values as recommended by Dukes and Schwarte.

of blood. The technic of operation is to moisten a piece of filter paper with blood and match this to the color scale.

The Dare hemoglobinometer is an instrument that compares undiluted blood with a colored, circular glass disk, of varying thickness, as a standard. On the scale, 100 per cent is said by the makers to correspond to 13.77 gm of hemoglobin per 100 cc of blood.¹¹

The Newcomer¹² hemoglobinometer utilizes the brown glass disk selected by Newcomer. This glass disk serves as a standard with which an acid hematin solution of the blood being examined is compared. On this scale 100 per cent is equivalent to 16.92 gm of hemoglobin per 100 cc of blood. Owing to the turbidity of acid hematin solutions of chickens' blood, a blue-colored glass disk supplied with the instrument must be employed in making the readings.

The Sahli hemoglobinometer consists of a standard solution of acid hematin or a yellow glass rod with which is compared a solution of acid hematin of the blood under examination. On this scale, 100 per cent should correspond to 17.3 gm of hemoglobin.¹¹ This method was not used in this study as it is similar in principle to the Newcomer instrument. The factor of turbidity of the acid hematin solution should be borne in mind when applying this instrument to determining hemoglobin in chickens' blood.

The photo-electric hemoglobinometer of Sheard and Sanford^{13, 14} in principle involves the measurement of the percentage transmission of light from a standard source falling on a photo-electric cell after such light passes through a solution of oxyhemoglobin and a spectral filter. This instrument is standardized with the oxygen-capacity method of van Slyke.¹⁵ Sanford and Sheard¹³ stated that the results for blood of human subjects, when compared with the values of the van Slyke apparatus, reveal a percentage error not in excess of 4 per cent and averaging less than 2 per cent. The position of the beta absorption band of the spectrum of oxyhemoglobin of the chicken is very nearly identical to that of the oxyhemoglobin of man.¹⁶ It, therefore, follows that the instrument may be employed in the estimation of the blood of the chicken without change of the spectral filter or modification of the scale.

COMPARATIVE STUDY

The instruments used in the comparative study were the photo-electric hemoglobinometer of Sheard and Sanford, and the hemoglobinometers of Newcomer, Dare, and Tallqvist.

The Sheard and Sanford and Newcomer hemoglobinometers were compared to each other by taking ten readings with each instrument on the blood of each of ten different fowls. It was found that the Newcomer instrument rendered higher values for hemoglobin than were obtained with the photo-electric instrument. The difference, however, was consistent. After applying the correction factor of Dukes and Schwarte, the readings

obtained by the Newcomer instrument were lower than the corresponding photo-electric readings (fig. 1).

As it may be of value to others interested in determinations of the value for hemoglobin in chickens, the equations for conversion of the readings of one instrument to the other have been calculated. To convert the reading of the Newcomer instrument into grams of hemoglobin per 100 cc of blood, as measured by the photo-electric hemoglobinometer, the following equation may

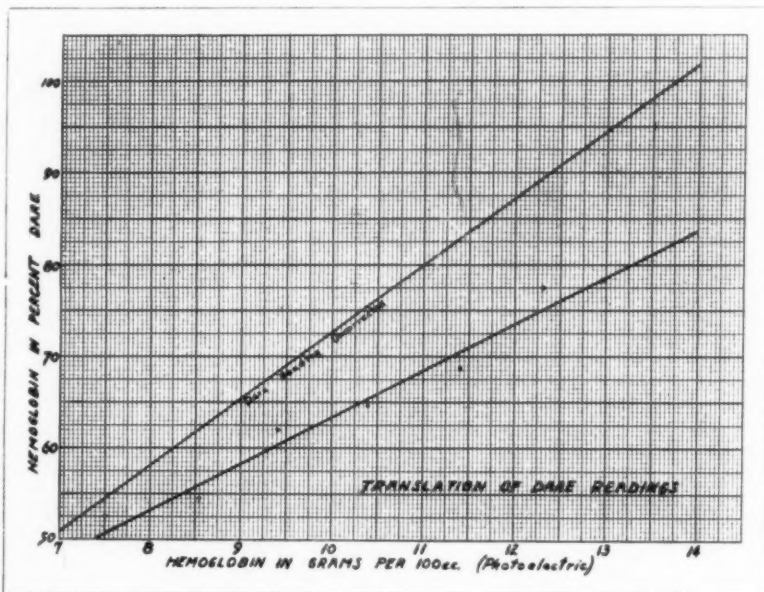


FIG. 2. The relationship between the hemoglobin values of chickens' blood as measured by the Dare and photo-electric hemoglobinometers. Each point is the mean of readings taken within certain limits of grams of hemoglobin per 100 cc of blood as measured by the photo-electric instrument. The hemoglobin in 200 samples of blood was measured by each instrument. A line indicating the conversion of the percentage reading to grams per 100 cc of blood is indicated.

be utilized:

$$\text{Gm per 100 cc} = 0.16365 \text{ Newcomer (per cent)} - 0.437$$

To translate the readings of the photo-electric hemoglobinometer into per cent Newcomer readings:

$$\text{Newcomer (per cent)} = 6.1106 \text{ photo-electric (grams)} + 2.67$$

The Dare and Tallqvist hemoglobinometers were compared to the photo-electric instrument by a series of 200 simultaneous readings of each instrument on the blood of different chickens. Neither the Dare nor the Tallqvist instrument indicated as good

a relationship with the readings of the photo-electric hemoglobinometer as was obtained with the Newcomer. With the first two instruments the readings tend to be proportionally lower as the value of hemoglobin increases (figs. 2 and 3). A similar tendency of the Dare instrument was noted by Senty,¹⁷ working with blood of human subjects. This discrepancy of the Dare instrument may be due in part to fading of the colored glass disk. The readings of the Tallqvist instrument are, of course, only approximate at best.

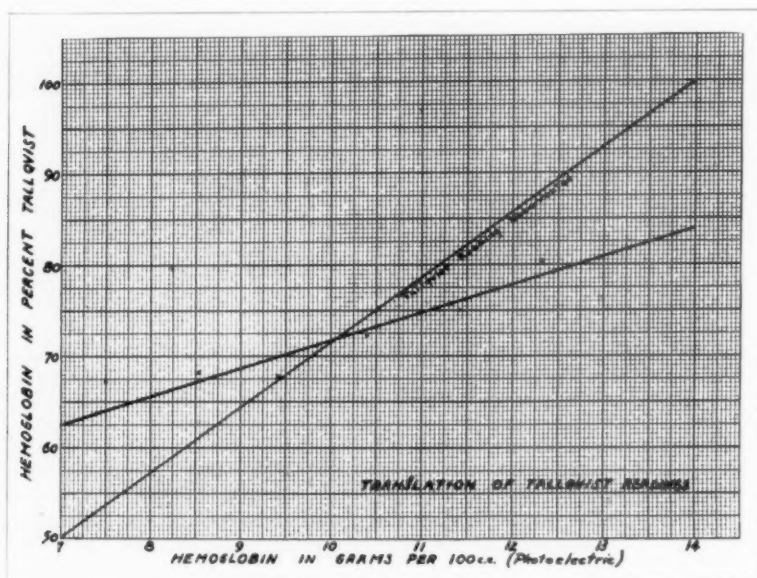


FIG. 3. The relationship between the hemoglobin values of chickens' blood as measured by the Tallqvist and photo-electric hemoglobinometers. Each point is the mean of readings taken within certain limits of grams of hemoglobin per 100 cc of blood as measured by the photo-electric instrument. The hemoglobin in 200 samples of blood was measured by each method. A line indicating the conversion of the percentage reading of the Tallqvist hemoglobinometer to grams per 100 cc of blood is given for comparison.

A study of the variability of measurement of the Newcomer and photo-electric instruments was undertaken, as these methods appeared to be the better adapted for measuring hemoglobin of chickens. A series of ten readings on each of ten different fowls were made by the two instruments. The coefficient of variation was calculated for each series.

The coefficients of variation of the photo-electric hemoglobinometer were found to vary, which might indicate that this instrument reads slightly more precisely at certain times (table III).

The mean coefficient of variation of the photo-electric instrument was 2.5 per cent. This would imply that with a given reading of 10.58 gm of hemoglobin per 100 cc of blood, there is a two-thirds probability of it being correct within 2.5 per cent or ± 0.26 gm. The mean coefficient of variation of the Newcomer hemoglobinometer was 1.33 per cent. With a given reading of 66.7 per cent (11.20 gm per 100 cc uncorrected), this would imply a two-thirds probability of it being correct within 1.33 per cent or ± 0.88 per cent (0.15 gm per 100 cc uncorrected). These data

TABLE III—Accuracy of readings of hemoglobin.

SERIES	HEMOGLOBINOMETER			
	PHOTO-ELECTRIC		NEWCOMER	
	STANDARD DEVIATION (Gm)	COEFFICIENT OF VARIATION (%)	STANDARD DEVIATION (Gm)	COEFFICIENT OF VARIATION (%)
1*	0.38	3.2	1.1	1.5
2	0.37	4.2	0.6	1.0
3	0.30	3.3	0.7	1.3
4	0.56	1.5	0.8	1.6
5	0.04	0.5	0.7	1.1
6	0.09	0.9	0.8	1.3
7	0.07	0.8	0.8	1.4
8	0.42	2.9	0.8	0.9
9	0.49	3.6	0.8	1.0
10	0.44	4.1	1.5	2.2
Mean	0.316	2.50	0.86	1.33

*Each series is the compilation of ten specimens taken at the same time from the same bird. The photo-electric and Newcomer samples were taken from different birds at different times.

would indicate that the Newcomer hemoglobinometer might give a more consistent reading than the photo-electric hemoglobinometer.

The Newcomer instrument is not applicable in the estimation of the hemoglobin content of the blood of chickens ill with leucosis, as the increased number of immature cells increases the turbidity of the acid hematin solution and disturbs the reading of the sample. The photo-electric instrument is apparently not affected in this respect.

SUMMARY

Five methods recommended for the enumeration of erythrocytes and leukocytes, two methods for the enumeration of thrombocytes, and four methods recommended for the estimation of the quantity of hemoglobin were studied in a comparative manner for the purpose of determining a suitable procedure for the ex-

amination of chickens' blood. These methods were applied to chickens' blood and their accuracy and relative merits determined. The data were subjected to statistical analysis.

The five methods of counting erythrocytes were found to yield nearly the same counts and had nearly the same degree of accuracy. The method proposed by Wiseman was slightly more accurate and consistently gave slightly higher erythrocyte counts.

The method of counting leukocytes that utilizes Toisson's solution as a diluent gave more consistent results than the other two direct methods, and when used on normal blood was considered the method of choice. Of the two indirect methods, the Wiseman was considered more suitable. For abnormal blood, as that in erythroleukosis, the direct methods are not applicable. The indirect methods will more nearly approximate the true number of leukocytes per cubic millimeter of blood of this type.

The two methods for the counting of thrombocytes gave results which were not significantly different.

The photo-electric and Newcomer hemoglobinometers were in close agreement on measurement of the hemoglobin of the chicken. Although the values as read on the scale were different, the difference was consistent. As certain errors in the process of making hemoglobin determinations have been established by others, and as in theory and practice the photo-electric hemoglobinometer appears to be applicable to the measurement of chicken hemoglobin without alteration, translation equations for conversion of the readings of one instrument to the other are given.

The Dare and Tallqvist hemoglobinometers were not considered to be applicable for the accurate measurement of the hemoglobin of the chicken.

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Boosting the Veterinarian

Chappel Bros., Inc., of Rockford, Ill., have published a bulletin on feeding entitled, "And Now About Food." It is stated that approximately 100,000 copies of this bulletin will be in the hands of dog-owners throughout the United States during the present year. The following paragraph quoted from the bulletin should be appreciated by veterinarians:

There are times when a dog just doesn't act natural. Instead of trying to change his diet and fuss about his food, he should be taken to a graduate, licensed veterinarian—the one man qualified to diagnose his ailments and prescribe treatment. Dogs are susceptible to certain diseases and worms are always a source of trouble. One should not try his own ideas in treating the dog's ailments but seek the best professional advice available. Once or twice a year, a physical audit should be made. This will protect the dog and give reasonable assurance that he will have a long life of health and usefulness. Occasional weighings should be made, as a loss in weight is an index of pending trouble.

Just figure out for yourself what 100,000 boosts like the above are worth to the veterinary profession.

O. S. U. Quarterly Suspends Publication

The Alumni Association of the College of Veterinary Medicine of Ohio State University has voted to discontinue the publication of the *Alumni Quarterly* with the completion of the present Volume XXII (March, 1935). This action was taken by members of the Association at the annual meeting on January 15, 1935. It was pointed out at the meeting that, since the subscription list of the *Quarterly* includes only a portion of the alumni, a news letter to every alumnus twice a year would be more effective than the present arrangement. It is also planned, if finances will permit, to issue an annual report each year, detailing the activities of the College. The first news letter will be mailed in June, 1935.

REPORT ON BRINE TREATMENT OF HYPODERMA LARVAE IN THE BACKS OF CATTLE*

By J. STOTCHIK, Galesburg, Ill.

Zoölogical Division, U. S. Bureau of Animal Industry

Common salt (sodium chloride) has long been used by some stockmen to kill grubs in the backs of cattle. The salt is sprinkled over the backs of the infested animals or is applied as a wash in the form of brine. Some cattlemen claim good results for this method. Bishopp and his co-workers¹ give tabulated data on the effect of salt on *Hypoderma lineatum*, and list three grubs killed out of 21 treated with a saturated solution of sodium chloride and 14 grubs killed out of 91 treated with dry sodium chloride; in the later case 30 grubs are listed as "doubtful," that is, it remained undetermined whether one-third of the grubs treated survived or were killed. Hadwen² reports that in Canada for generations some farmers have used brine to kill warbles and that some claim to have obtained good results. He states that "applications of salt were found to kill grubs, but the older larvae were not so amenable to treatment as the younger ones," and advocates further investigation of the salt method.

The present report is an account of experimental treatment of several grub-infested cattle with brine, *i. e.*, a saturated solution of sodium chloride. Salt in this form was deemed most suitable since it penetrates the grub openings in the hide more readily than dry salt; also because, when used as a wash, the salt precipitates and covers the back of the animal, much as when dry salt is applied. The tests were conducted at two stations: at Lamar, Colorado, where only *Hypoderma lineatum* is found, and at Galesburg, Illinois, where *H. bovis* and *H. lineatum* are prevalent. At Lamar all work was done in coöperation with Dr. C. E. Smith.

Six grub-infested, long-haired Hereford yearlings were treated with brine on a prearranged schedule and each animal was marked for identification by a serial number clipped in the hair. The brine was warmed until it felt hot to the touch and was then scrubbed over the backs of the cattle with a stiff brush. The test was concluded by extracting all the grubs, the instar of each grub was determined, and a record was made of the number of grubs alive and the number dead. The data are summarized in table I (method 1).

It will be observed that 250 grubs were extracted and that all were found to be alive. Of the total, only five third-stage grubs

*Received for publication, December 8, 1934.

were recorded. It should be noted that the small proportion of the young grubs to the total number is normal. It is doubtless due to the short molting period of third-stage larvae, which averages only about three to four days, as established by Bishopp and his co-workers.¹

To test further the possibilities of killing *Hypoderma* larvae by the application of sodium chloride, brine was injected directly into the grub cyst. For this purpose a small can was used, of

TABLE I—Results of treating *Hypoderma* larvae in the backs of cattle with brine.

ANIMAL	METHOD OF APPLICATION; DATE OF TREATMENT AND EXTRACTION OF GRUBS	LIVE GRUBS EXTRACTED AFTER TREATMENT*			
		TOTAL	INSTAR		
			3	4	5
1	1. Brine (hot to touch) applied with stiff brush, Lamar, Colo., 1931.† Treated December 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26; extracted December 28.....	53	1	14	38
2	Treated December 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26; extracted December 18 and 28.....	11 49		8 12	3 37
3	Treated December 6, 9, 12, 16, 19, 23, 26; extracted December 28.....	30		15	15
5	Treated December 6, 12, 19, 26; extracted December 28.....	65		15	50
6	Treated December 6, 12, 19, 26; extracted December 28.....	42	4	18	20
Totals.....		250	5	82	163
7	2. Brine (at about body temperature) injected into grub cyst with small oil can, Lamar, Colo., 1931. Treated December 18; extracted December 25.....	19		7	12
1	3. Brine (at ordinary room temperature) injected into grub cyst with small oil can, Galesburg, Ill., 1932. Treated February 3; extracted February 6.....	11		11	
2	Treated February 3; extracted February 6.....	8	1	6	1
3	Treated February 9; extracted February 16.....	43	1	17	25
Totals.....		81	2	41	38

*No dead grubs were found on extraction.

†Tests 1 and 2 were conducted in cooperation with Dr. C. E. Smith.

about 20-cc capacity, equipped with a fine spout and delivering about 0.5 cc at a time. The spout was inserted into the grub openings in the hide to a depth of $\frac{1}{4}$ to $\frac{3}{8}$ inch and about 1 cc of brine was injected; it was observed that this amount of fluid was generally enough to cause some back-flow. Four animals were used in the test; grub cysts on a yearling Hereford were injected with brine at about body temperature, and a yearling and two cows, of mixed breed, were treated similarly with brine at about 70°F. Prior to treatment a mark was clipped in the hair just below each grub and the location diagrammed. The grubs were extracted seven days after the date of treatment and all were found to be alive. Refer to table I, methods 2 and 3.

The negative results of the tests described above are definite indications that brine (saturated solution of sodium chloride) has no lethal effect on any of the several stages of *Hypoderma* larvae *in situ*, when applied as a wash without previously clipping the hair, and that injection of brine directly into the grub cyst is equally of no avail.

Since Hadwen² reports that in Canada cattle are clipped six inches on either side of the back-bone as a preliminary to the application of brine, it appeared desirable to determine the possibilities of such treatment under approximately similar conditions. With this in view, a Holstein yearling steer with 33 grubs was used in an experimental treatment with brine, and a heifer of the same breed with 18 grubs was used as a check. The weather being rather severe, it was deemed inadvisable to clip the hair over the entire region of the back, and only the hair over the grub swellings was clipped with scissors. The location of the grubs was diagrammed and numbered. On each date of treatment, an examination was made for new grubs and, when found, the hair over them also was clipped, the location marked on the diagram with a different colored pencil, and numbered. Through the duration of the test the hair was clipped from time to time, as needed, to keep it short over the grubs. Brine at about 70°F. was scrubbed over the back of the steer with a stiff brush approximately every other day (see table II for dates); the heifer was not treated.

Frequent observations were made on the development of the larvae, as judged by the external appearance of the lesions, principally the size of the openings in the hide. A few lesions were found to have healed, and from a few the grubs were missing. Grubs which appeared to have attained full development were extracted. The data are presented in table II.

It will be observed that in the treated animal 64 grubs were recorded from March 1 to March 28, the duration of the test; for the same period 27 grubs were recorded in the check animal. Omitting from calculations the healed lesions and missing grubs, since the fate of these grubs is necessarily conjectural, and comparing the treated animal and the check animal on the basis of dead grubs extracted, the results may be summarized as follows:

	Total Grubs	Number Dead	Per cent Dead
Treated animal	64	11	17.2
Check animal	27	3	11.1

Since the proportion of dead grubs in the check animal is only little less than in the treated animal, and is very slight in either case, the brine evidently cannot be credited with killing the few grubs. With special reference to young larvae, attention is invited to the fact that all grubs appearing after March 1 were recorded before each treatment and were subjected to the action of brine within a day or two after perforating the hide. The data indicate that clipping the hair over the grub lesions did not enhance the action of the brine and that it remained non-lethal for the young grubs as well as for the more mature larvae. There may be some question as to what killed the few grubs. The assumption seems to be warranted that it was due to clipping of the hair and frequent handling incidental to examination, especially when it is considered that in the absence of these two factors in the previous tests no dead grubs were recorded. The slightly greater percentage of grub mortality recorded for the treated animal may reasonably be accounted for by the frequent scrubbing with a stiff brush over the clipped locations of the grubs.

SUMMARY AND CONCLUSIONS

Brine consisting of a saturated solution of sodium chloride was tested experimentally for the lethal effect on *Hypoderma* larvae. The brine was applied as a wash on one lot of grub-infested, long-haired cattle; another lot of infested cattle was similarly treated, but the hair over the grubs was clipped prior to the application of brine. Still another lot of infested cattle was treated by injecting brine directly into the grub cysts. The results were checked by extracting the grubs and determining the number alive and number dead. The data indicate that a saturated solution of sodium chloride is non-lethal for all stages of *Hypoderma* larvae in the backs of cattle.

REFERENCES

- ¹Bishopp, F. C., Laake, E. W., Brundrett, H. M., and Wells, R. W.: U. S. Dept. of Agr. Bul. 1369 (1926), pp. 28-96.
- ²Hadwen, S.: Salt treatment for warble larvae in cattle. Jour. Parasitol., xix (Sept., 1932), p. 87.

A WHOLE-BLOOD FIELD AGGLUTINATION TEST FOR BANG'S DISEASE IN RANGE CATTLE*

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The experimental work which has been done with the control of Bang's disease in cattle has been carried out almost entirely with dairy herds and small herds of pure-bred beef animals. The problem of controlling the disease under so-called range conditions has many different angles, and the methods which have been more or less successful with dairy herds are very difficult to apply under the conditions existing in the range states.

A method of keeping the infection under control, which appears practicable, is to test the breeding herd once a year, at shipping time in the fall; and at that time cut out for shipment all reacting cows. This should eliminate all dangerous animals, as there should be no cows in the early stages of the disease at that time of year. The calves are all born in the spring, and on the summer range the chances of picking up infection are very small. The application of the standard laboratory test at shipping time presents some difficulties. The two principal obstacles are the individual identification of the cattle, and the fact that the herd must be held for about a week and rehandled, to cut out the reactors after the report comes back from the laboratory. The cattle are often moved several miles to the corrals to be "worked," and frequently a shortage of feed makes it impractical to hold them for more than a day or two.

This laboratory has developed an adaptation of the whole-blood agglutination test as used in testing for pullorum disease, which overcomes the obstacles that interfere with the standard laboratory test. The test is completed while the cattle being tested are still held in the chute. A second handling of the cattle is thus made unnecessary, and the marking of the reactors in the chute does away with the problem of individual identification. We believe that simplifying the work of handling the cattle will make it possible to interest range cattlemen in culling their herds on the basis of annual agglutination tests.

THE ANTIGEN

The antigen used has been prepared according to the method described by Donham and Fitch,¹ with the exception that only one

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strain of the organism has been used. To this antigen is added 5 per cent of a 3 per cent aqueous solution of methyl violet, imparting a deep blue color to the antigen.

THE METHOD OF BLEEDING

The blood sample is obtained by making a small incision at the tip of the tail. We prefer tail-bleeding to drawing blood from the jugular vein for two reasons, the most important of which is the matter of time. A cow can be bled from the jugular vein as rapidly as from the tail, but with jugular bleeding the testing would take much longer, because each cow would have to be held in the squeeze until the test was completed; while with the tail-



FIG. 1. Tail-bleeding in a pole chute holding eight to ten cattle.

bleeding method, eight or ten cows can be held in the chute and bled and tested almost simultaneously. (See figure 1.) The time consumed in waiting for the completion of the test thus applies to a group of animals rather than to each individual. We find that by this method 40 to 50 cattle an hour can be tested without giving any one blood sample less than five minutes for the completion of the test. A second advantage of tail-bleeding is that any ordinarily intelligent cow-hand can be taught in a few minutes how to do the bleeding for the operator, and two or three men can thus be bleeding cattle at the same time.

The end of the cow's tail is drawn out between the bars of the chute, and the brush turned back so that the tip of the tail is exposed. The point of the knife, a straight bistoury, is inserted in the median line, about 2 cm from the tip of the tail, and the cut carried parallel to the long axis of the tail through the tip. Figure 2 shows the operator bleeding by this method. Figure 3 shows the position of the knife in making such a cut.



FIG. 2. Technic of tail-bleeding, showing method of holding tail.

To insure a free flow of blood, we have found it best, before making the incision, to whip the tail against the side of the chute, or to rub it briskly between the hands to stimulate the local circulation. The tail must not be held high, or pinched between the chute-bars, or held too tightly. A free incision is necessary so that the blood will drip rapidly into the tube. Using only a slight incision, results in slow bleeding, partial coagulation and imperfect mixing with the citrate. Too much emphasis cannot be placed on the necessity of having a fluid blood sample with which to work. Nearly all the errors made by the beginner in

using this test are due directly to slow bleeding and improper mixing with the citrate solution. If, as sometimes happens, a free flow of blood cannot be obtained from the tail, the animal's head should be secured to the side of the chute and the blood taken from the marginal vein of the ear.



FIG. 3. Technic of tail-bleeding, showing position of knife.

We use the standard bleeding-tube (15x100 mm), containing 0.2 cc of a 17 per cent sodium citrate solution. Approximately 2 cc of blood is collected in the tube and mixed with the citrate by slightly shaking the tube during the bleeding. After thorough mixing with the citrate solution, the tube is taken at once to the testing-table and placed in a tube-rack.

When this test was first attempted, we made a smaller incision in the tail, collected a single drop of blood on a micro slide, and took it directly to the testing-table. Under favorable conditions this method worked very well, but under unfavorable conditions it would not work at all. Inexperienced or awkward bleeders

failed to collect the right amount of blood on the slide. In open sunlight, in hot weather, the drop partially coagulated before the antigen could be mixed with it. The method seemed ideal, and involved a simpler technic than the citrated tube method, but there were too many errors made, due to coagulation of the drop in warm weather and the difficulty of obtaining a drop of the desired volume.



FIG. 4. The equipment for testing as set up in the field.

METHOD OF MAKING THE TEST

A small table is set up near the chute. Figures 4 and 5 show a portable table that we have used, which can be easily carried in a car. The legs, made of half-inch iron rods, are removable and are carried beneath the table top, as shown in figure 5. A testing-box, similar to those used in rapid whole-blood testing for pul-lorum disease, was constructed (fig. 6). A glass plate rests about 1 cm above a white enameled metal plate, affording reflected light for reading the reactions. A sliding glass cover affords protection

against dust and evaporation, while the body of the box contains a metal can for hot water, to be used for warming the box in cold weather. As it was found that drying of the blood-smears in windy or hot weather was a factor to be reckoned with, a separate compartment was made for each blood sample, so that as soon as the blood drop and antigen drop are thoroughly mixed, the compartment is closed by sliding in the glass cover, and is not opened again until the reaction has been read. These compartments are numbered serially, so that the blood sample from the first cow in the chute is placed in compartment 1, that from the second cow in compartment 2, and so on.

As soon as each tube of citrated blood is received at the table, the test sample is drawn from the tube by a pipette calibrated to

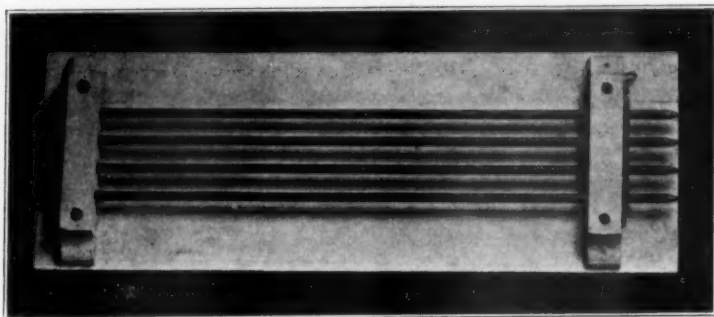


FIG. 5. Portable table, as carried in the car.

deliver a .03-cc drop. This amount of whole blood is assumed to contain about .02 cc of serum, which with our antigen corresponds to a dilution of 1:50 in the tube test. This drop is placed on a micro slide in the compartment of the testing-box corresponding with the position of the cow in the chute, and .03 cc of antigen added. The blood and antigen are mixed thoroughly with a metal stirring-rod, which is wiped off between tests.

In the case of a strong reaction, agglutination of the antigen into large, deep-blue clumps, contrasting with the red blood, will occur almost immediately. In low-titre reactions the agglutination occurs more slowly and the clumps are smaller. A sample should not be considered negative until the blood and antigen have been in contact at least five minutes. This means that the reading of the reactions is completed after the the last sample to which the antigen has been added has stood for five minutes. The number of samples tested at each run depends upon the number of cows that the chute can accommodate, usually about eight

or ten. The cows being tested are held in the chute until the test is complete, when the reactors are marked, the chute emptied, refilled from the corrals, and the process repeated until the herd is tested. Under favorable conditions we have tested a herd of 600 animals in two short days.

It is not desirable, however, to assure the owner that cattle can be handled at any given rate. When testing a large herd, there is a tendency to hurry the cattle through in order to get a certain quota tested each day, resulting in hurrying the test

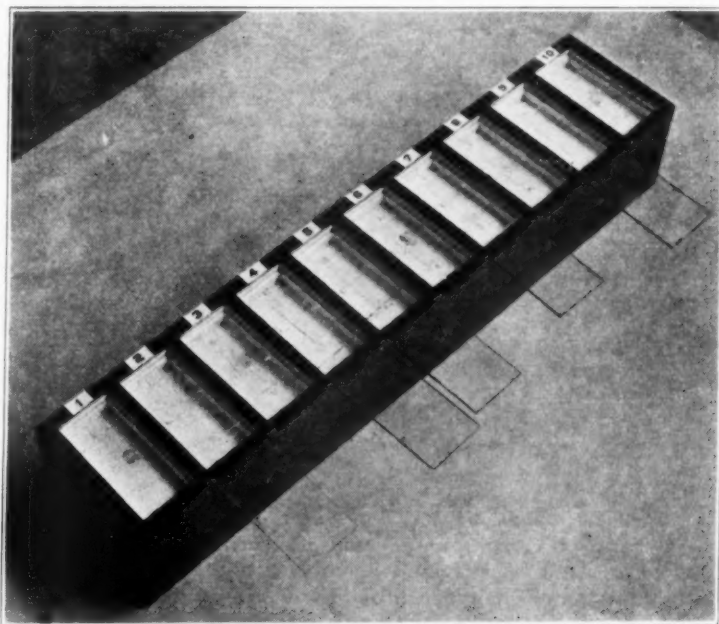


FIG. 6. Testing box.

and reading reactions before five minutes have elapsed, with consequent inaccuracies.

Those who have used the rapid serum test have observed that reactions take place more promptly if the plate is kept warm. In outdoor testing in the cool fall days it is essential to keep the antigen and testing-box warm. In the testing-box described above, the hot-water container hold two gallons, and if the hot water is renewed two or three times a day, it affords adequate heat for the plate. Without this heat many low-titre reactions will not be detected, especially early in the morning and late in the afternoon.

ACCURACY OF THE WHOLE-BLOOD TEST AS COMPARED WITH THE STANDARD SERUM TESTS

As there are no published records of the results of whole-blood agglutination tests with a stained *Brucella* antigen, it was necessary for us to establish the dependability of this method of testing as compared with the standard serum tests.

Table I shows the results of such a comparison, under laboratory conditions, eliminating the hazards of field testing. Blood was taken from the jugular vein of 181 cows of a known infected herd, two samples being taken from each cow. One sample was



FIG. 7. General view of corrals and cattle during test.

drawn in the usual manner and allowed to coagulate. The second sample was prevented from clotting by drawing about 2 cc of blood into a tube containing 0.2 cc of a 17 per cent solution of sodium citrate. After taking both sets of samples to the laboratory, three agglutination tests were made for each animal. The citrated blood was used for the whole-blood plate test. Both the tube test and the rapid plate test were used for the serums from the coagulated blood samples. It was found that no reactions occurred in the standard tests of serums which were negative in the whole-blood test.

In table I there are tabulated the reactions of 40 of the 181 cows which showed any degree of agglutination. The stained antigen was used both for the citrated whole blood and the serum. Four dilutions were used in each case, the amounts of serum being .04 cc, .02 cc, .01 cc and .005 cc. The amount of antigen added

was .03 cc. To simplify the table no attempt has been made to record variations in the completeness or rapidity of agglutination. Definite agglutination in any degree has been designated as +. In some cases the sign \pm has been used to indicate a trace of agglutination. It will be seen that there is very close agreement between the readings for the whole blood and for the serum, except that, in general, the titre is slightly higher with the serum. This can be accounted for by the fact that in any given

TABLE I—Reaction of 40 cows tested by using whole blood and serum.

Cow	CITRATED WHOLE BLOOD				SERUM			
	.04	.02	.01	.005	.04	.02	.01	.005
00	+	+	\pm	—	+	+	+	—
029	+	—	—	—	+	+	—	—
040	+	+	+	+	+	+	+	+
17	+	\pm	—	—	+	+	+	—
20	+	+	+	+	+	+	+	+
23	+	\pm	—	—	+	+	—	—
29	+	+	+	—	+	+	+	+
33	+	+	+	+	+	+	+	+
39	+	+	+	+	+	+	+	+
40	+	+	+	+	+	+	+	+
42	+	+	+	+	+	+	+	\pm
48	+	+	+	+	+	+	+	+
50	+	+	+	+	+	+	+	+
53	+	+	+	+	+	+	+	+
56	+	+	+	\pm	+	+	+	\pm
58	+	+	+	\pm	+	+	+	\pm
60	+	\pm	—	—	+	+	\pm	—
61	+	+	+	—	+	+	+	—
66	\pm	\pm	—	—	+	—	—	—
78	+	\pm	—	—	+	+	+	+
83	+	+	+	+	+	+	+	+
91	+	+	+	+	+	+	+	+
154	+	\pm	—	—	+	+	+	\pm
174	+	+	+	+	+	+	+	+
176	+	+	+	+	+	+	+	+
178	+	+	+	+	+	+	+	+
206	+	+	+	+	+	+	+	+
211	+	+	+	+	+	+	+	+
213	+	\pm	—	—	+	+	—	—
217	+	+	+	+	+	+	+	+
253	+	+	+	+	+	+	+	+
256	+	+	+	\pm	+	+	+	+
279	+	+	+	+	+	+	+	+
321	+	+	+	\pm	+	+	+	+
350	+	\pm	—	—	+	+	—	—
361	+	+	+	+	+	+	+	+
406	+	+	+	+	+	+	+	+
471	+	+	+	+	+	+	+	+
743	+	+	+	+	+	+	+	+
828	+	+	—	—	+	+	\pm	—

amount of whole blood, only about 60 per cent is serum. The results of this comparative test confirm our assumption in field testing that .03 cc of whole blood is approximately the equivalent of .02 cc of serum.

Table II shows the results of five tests on each of the cows which showed any definite reaction to any test. In the first column is shown the reaction to the whole-blood test as made in the field. The second and third columns show the reactions to the whole-blood test applied in the laboratory with two antigens. The remaining columns of the table show the reactions to the standard tube test and to the plate test made with the stained antigen.

The reason for recording results with two antigens is that it was found that antigen 1, which was used in the field in this case, was unusually sensitive and detected sensitization in cows that were negative in the tube test. Therefore, the laboratory test with the citrated whole blood was made with two antigens, antigen 2 being one which had been in use for some time and had given results comparable with the tube test. The results shown in table I were obtained with antigen 1, and therefore the titres are higher than in table II.

In addition to the 39 cows represented in this table, there were in the herd 142 animals which were negative in all tests. No reaction occurred in the tube test in the case of any blood sample which had been negative in the field test.

The table shows that the reactions recorded in the field corresponded exactly to those recorded for the whole blood and antigen 1 in the laboratory, except that in five cases, where only a trace of agglutination was recorded in the field, definite agglutination was recorded in the laboratory test. In 13 of the cases showing reaction with antigen 1, the results with antigen 2 were negative. In all of these cases except one, the tube reaction was of a low titre, or negative, indicating that antigen 1 was too sensitive for the purpose. There was close agreement between the results of the tube test and the results of the plate test on serum, using antigen 2.

Table III is a tabulation of eleven combination tests comparing the results of field whole-blood tests and laboratory serum tests. These records cover a period of nearly two years and show some variation in method as the technic was developed. The table shows a sufficiently close correlation between the two tests to make the field test of practical value. Where jugular bleeding was practiced, 100 per cent of 1:100 reactors were detected by the field test, and in four of six herds, 100 per cent of the 1:50 reactors were detected. Where tail-bleeding was practiced, the per-

centage of correlation was slightly lower. The table shows a number of positive readings in the field test on cows which were negative, or of a low titre, when tested by the laboratory method, indicating that the antigen used may be slightly more sensitive than is desirable.

Attempts to correlate the type of reaction in a one-dilution field test with the titre determined by the laboratory test have

TABLE II—Comparative results of five tests on 39 cows.

Cow	FIELD TEST ANTI- GEN 1	LABORATORY TESTS									
		CITRATED WHOLE BLOOD		SERUM							
				TUBE TEST				PLATE TEST		ANTIGEN 2	
		ANTI- GEN 1	ANTI- GEN 2								
				.04	.02	.01	.005	.04	.02	.01	.005
00	±	+	±	±	—	—	—	+	±	—	—
029	±	+	—	—	—	—	—	±	—	—	—
040	+	+	+	+	+	+	+	+	+	+	+
17	+	+	—	+	—	—	—	±	—	—	—
20	+	+	+	+	+	+	+	+	+	+	±
23	+	+	—	—	—	—	—	±	—	—	—
29	+	+	±	+	+	+	—	+	+	—	—
33	+	+	+	+	+	+	+	+	+	+	+
39	+	+	+	+	+	+	+	+	+	+	+
40	+	+	+	+	+	+	+	+	+	+	+
42	+	+	—	+	+	—	—	—	—	+	—
48	+	+	—	+	+	+	+	+	+	+	±
50	+	+	+	+	+	+	+	+	+	+	+
53	+	+	+	+	+	+	+	+	+	+	±
56	+	+	+	+	+	—	—	+	±	—	—
58	+	+	±	+	+	±	—	+	±	—	—
61	+	+	—	+	+	±	—	+	±	—	—
78	0	+	—	+	±	—	—	+	+	±	—
83	+	+	±	+	+	—	—	+	+	—	—
91	+	+	+	+	+	+	—	+	+	—	—
154	+	±	—	+	—	—	—	+	—	—	—
174	+	+	+	+	+	+	+	+	+	+	+
176	+	+	+	+	+	+	+	+	+	+	+
178	+	+	+	+	+	+	+	+	+	+	+
206	+	+	+	+	+	+	+	+	+	+	+
211	±	+	±	+	+	+	—	+	+	±	—
213	±	+	—	—	—	—	—	+	—	—	—
217	+	+	+	+	+	+	+	+	+	+	+
253	+	+	+	+	+	+	+	+	+	+	+
256	+	+	—	+	+	—	—	+	±	—	—
279	+	+	+	+	+	+	+	+	+	+	+
309	+	±	—	—	—	—	—	—	—	—	—
321	+	+	+	+	+	+	±	+	+	+	—
350	+	+	—	+	—	—	—	—	—	—	—
361	±	+	+	+	+	+	+	+	+	+	+
406	+	+	±	+	+	+	—	+	+	+	—
471	+	+	+	+	+	+	+	+	+	+	+
743	+	+	+	+	+	+	+	+	+	+	+
828	+	+	—	+	—	—	—	—	—	—	—

TABLE III—Results of combination tests of eleven herds.

HERD	METHOD OF COLLECTING BLOOD	ANIMALS TESTED	POSITIVE REACTIONS		PERCENTAGE OF 1:50 REACTORS POSITIVE TO FIELD TEST	PERCENTAGE OF 1:100 REACTORS POSITIVE TO FIELD TEST	POSITIVE TO FIELD TEST AND NEGATIVE OR SLIGHT AT 1:50	
			FIELD TEST	SERUM TEST				
				1:50				1:100
1	Jugular	34	20	19	18	95	100	1 (positive at 1:25)
2		33	20	20	19	100	100	0
3		23	12	11	10	100	100	1
4		47	4	4	3	100	100	0
5		220	9	4	2	86	100	5 (positive at 1:25)
6		181	38	29	23	100	100	9 (4 positive at 1:25)
7		148	28	28	24	90	96	3 (positive at 1:25)
8	Tail	219	15	15	12	80	91	3
9		160	1	0	0	...	...	1 (positive at 1:25)
10		35	2	0	0	...	...	2 (1 positive at 1:25)
11		591	146	112	90	94	95	28 (23 positive at 1:25)

not been very satisfactory. While experience will enable the operator, judging by the time of the first appearance of the reaction, the size of the agglutinated clumps, and the completeness of the agglutination, to form an opinion as to whether or not the reaction indicates a high titre, after all there is a certain amount of guesswork in this, as is indicated in table IV. This table shows that on the field test cows 75, 83, 92 and 95 were designated as high-titre reactors. Of these, 92 and 95 failed to react in the high dilutions in the tube test. Cow 80, on the other hand, was designated as a low-titre reactor, and proved otherwise.

By varying the size of the blood drop, by special pipettes, or by wire loops, the desired number of dilutions can be made with whole blood as readily as in the rapid serum test and, when time permits, the agglutination titre can be definitely established. We have never attempted to use dilutions in field testing, for the time element is the essence of this method, and to test less than 200 to 300 cattle a day would defeat the principal object of the field test—the rapid handling of large herds of range cattle. While by not ascertaining the exact titre, we undoubtedly mark as reactors

TABLE IV—Comparison of field test with tube test.

Cow	FIELD TEST	SERUM TUBE TEST					
		1:25	1:50	1:100	1:200	1:400	1:800
66	++	+	+	+	±	—	—
69	++	+	+	+	+	+	+
73	++	+	+	+	+	±	—
75	+++	+	+	+	+	+	+
77	++	+	+	+	+	+	+
80	+	+	+	+	+	+	+
83	+++	+	+	+	+	+	+
92	+++	+	+	+	±	—	—
93	++	+	+	+	+	+	+
95	+++	+	+	+	±	—	—
97	±	—	—	—	—	—	—

Key: +=Slow reaction, barely complete in five minutes.

++=Complete in two to three minutes.

+++Complete in 20 to 30 seconds.

±=Incomplete.

The above designations apply only to the field test. The reactions recorded for the tube test are either positive (+), incomplete (±) or negative (—).

a considerable number of cattle that would not react at a 1:100 dilution, the owner suffers no financial loss by this error. Considering the purpose for which we recommend this test, we believe that it is unnecessary to distinguish between high and low titres. Where cattle are tested but once a year and the reactors

shipped, it is desirable to classify even low-titre reactions as positive. In a range herd of beef cattle this policy is economically sound, as a beef cow in good condition is normally worth as much for beef as she is as a breeder.

DISCUSSION

The work reported in this paper shows that a whole-blood agglutination test is practicable for the diagnosis of Bang's disease in cattle. Such a test has possibilities for use on many occasions where an immediate diagnosis is desirable, but our interest in developing such a test was in increasing the practicability of eliminating reactors from range herds. The possibility of making a diagnosis within five minutes of the time the blood is drawn eliminates the necessity of individually identifying the cattle, and of handling them a second time to cut out reactors.

A satisfactory stained antigen was developed, using the method of Donham and Fitch and adding 5 per cent of a 3 per cent aqueous solution of methyl violet. It was then established that the whole-blood reaction was as dependable as the serum tests. It was then necessary, in order to make the test practical for range use, to develop a technic which would meet the requirements of a field test. The factors which had to be considered were as follows:

1. The first consideration was that of time. The minimum time for reading the reaction was set at five minutes. If it were necessary to hold each animal five minutes before the next cow was bled, the time consumed in testing a large herd would be prohibitive. In order to overcome this difficulty, tail-bleeding was substituted for jugular bleeding. With this method, five to ten cattle are held in the chute and can be tested almost simultaneously, so that it is possible to test at the rate of 40 to 50 per hour.

2. It was found that coagulation, particularly in warm weather, often occurred before the reaction was complete. This was overcome by bleeding into tubes containing a small amount of sodium citrate solution. The citrate completely prevented coagulation if the blood flowed rapidly into the tube. With tail-bleeding it is highly important that the incision be made freely enough so that the blood drips rapidly.

3. Rapid drying, particularly in warm weather, had to be prevented. It was found that a glass cover over the testing-plate, containing ten samples, did not prevent drying, because it was necessary to open the chamber several times as each sample was brought to the table. Therefore, a testing-box was constructed with an individual compartment for each sample. The results with this box were entirely satisfactory.

4. As this test must be used outdoors at the cattle-chute, the weather condition is an important factor to consider. Extremely hot weather induces rapid coagulation and rapid drying, but these have been overcome by using sodium citrate and closed test chambers. The test can be carried out in freezing weather if necessary, by placing a can of hot water in a compartment provided for the purpose just beneath the test plate. Rain or snow or high winds interfere very materially with this outdoor test.

CONCLUSIONS

1. It has been demonstrated under laboratory conditions, that a whole-blood agglutination test for *Brucella* infection in cattle, using a stained antigen, is as dependable as the standard serum tests.

2. The stained antigen is recommended for plate tests of serum, also, as the reaction is more easily read with this antigen used over a white background, than with the unstained antigen over a light in a dark box.

3. A technic has been developed for field testing, using whole blood and stained antigen, which makes it possible to test range herds of cows, without individual identification, and without the necessity of a second handling of the cattle. This test is recommended for an annual test of range herds at shipping time, to be followed by culling and shipping all reacting animals.

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Tribute to a Dog

A dog that was famous in life, and still more famous in death, now has a lifesize statue erected to his memory, according to news dispatches from Tokyo, Japan. The dog to be so highly honored bore the name of Hachiko, and every day for eleven years he had faithfully met the train from which his master, dead since 1924, had once emerged to greet him. Death came to the loyal terrier on March 9, 1935, while he was again on his way to the station. Hachiko has been immortalized in song and story for his virtues of faithfulness and devotion, and to Japanese school children he is one of the nation's greatest heroes. The statue stands at the Aribuya Shibuya railroad station, to which his daily pilgrimages were made.

CHRONIC EQUINE ARTHRITIS*

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Today it is a well known fact that there exists both in man and horses a disease of the joints characterized by a tendency to become chronic. These conditions in man have been studied quite intensively by different groups of workers, approaching the subject from various angles. From the many and long-continued investigations of these pathological conditions the resulting conclusions indicate that the streptococci are very important etiological factors.

Poynton and Paine,¹ in 1900, described a diplococcus similar to *Streptococcus viridans* which they isolated from the blood of patients. Rosenau²⁻⁵ also has isolated a similar strain of streptococcus from lesions in such conditions. Swift and Kinsella⁶ have reported the presence of streptococci in a number of cases. Small⁷ and Birkhaug⁸ have isolated *Streptococcus cardio-arthritis*, a non-hemolytic, gamma type, inulin-fermenting streptococcus. Coburn and Pauli⁹ show that *Streptococcus hemolyticus* is a factor in the so-called rheumatic process. Burbank and Hadjopoulos¹⁰ assume the streptococcus to be the major causative factor in infective arthritis. Moon and Edwards,¹¹ Dawson, Olmstead and Boots,¹² Cecil, Nicholls and Stanisby¹³ and many others have all presented very convincing data to establish the fact that, while the pathogenesis of these conditions is not specifically determined, the streptococci are very important etiological factors. There is no proof that any single organism is the cause of these conditions.

Several years ago, one of the authors having been interested in the study of arthritis in man, purely from a laboratory standpoint, presented to the other the possibility of applying similar methods of diagnosis to animals, particularly the horse. It was hoped that such a comparative study might substantiate the value of such methods of diagnosis as an aid to determine the presence of various infections, especially those which might be very important to the breeder of Thoroughbreds.

Tom Hare,¹⁴ of London, has made some very interesting observations in connection with his studies of arthritis. He states:

As a general rule, this arthritis of the horse has been studied upon the regional or anatomical concept of the 'humoral' pathologists, viz.: Shoulder joint arthritis by Canton¹⁵ (1862). Carpel

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arthritis by Cherry¹⁶ (1845), Shrader¹⁷ (1860) and Kruger¹⁸ (1906). Articular ringbone by Udriski¹⁹ (1900), Karnbach²⁰ (1900) and Hunting²¹ (1908). Navicular disease by Smith²² (1886). Suffraginitis by Hunting²³ (1912) and Bretschneider²⁴ (1910). Stifle joint arthritis by Hohne²⁵ (1892), Zalewsky²⁶ (1901) and Hunting²³ (1912). Spavin by Eberlein²⁷ (1897), Cadeac²⁸ (1908) and Goldberg²⁹ (1918). Temporo-maxillary joint arthritis by Samodjelkin³⁰ (1912).

There may be many sound reasons why the regional classification has been maintained, in spite of the notion amongst the mid-nineteenth century veterinarians of an "osteo diathesis" (congenital predisposition) distinguishing this arthritis, yet it is sad to reflect that more attention has not been paid by veterinary science to this early concept and its interpretations by subsequent authors. For instance, Hohne²⁵ (1892) gave a detailed account of the changes in the stifle joint found in spavined horses and concluded that spavin arose secondary to a chronic gonitis. Smith²² (1893) classified ringbone and spavin, also navicular diseases, as "specific joint diseases" in which "there is something in common in the nature of the lesions produced which would lead one to suspect that the changes occurring in each are closely allied." Hunting²³ (1911) recognized the close resemblance of the lesions of spavin, suffraginitis, ringbone and navicular disease, to which list in 1912 he added the chronic arthritis of the stifle joint. Kruger¹⁸ (1906) and Bretschneider²⁴ (1910) have recorded similar observations.

To some medical investigators of this arthritis of unknown etiology, the terms rheumatoid and osteo-arthritis are synonymous; to others who follow the work of Garrod³² (1876) they represent two distinct types. One author will point to the variable etiology of osteo-arthritis, another will preserve its specific identity as the chronic stage of rheumatoid arthritis; yet other writers prefer to consider the disease in all its manifestations under such labels as arthritis deformans, chronic non-infectious, and chronic non-tuberculous arthritis. Then, accordingly as the concept of the investigator is that of the clinician or pathologist, the classification varies as between degenerative, proliferative, atrophic, deforming, mono-articular, polyarticular, and other types. This is all very perplexing to the investigator who is seeking for common ground upon which a definition can be established, for he finds that these typings, groupings and christenings are assumptions for the convenience of description. It is far easier to define what this arthritis is not, than to provide a positive definition which would find universal acceptance.

In 1912, T. W. Hastings³³ did complement fixation with streptococci in chronic infectious arthritis and in arthritis deformans, using a polyvalent antigen. This work has been elaborated by Burbank and Hadjopoulos,¹⁰ using many strains of streptococci instead of a single polyvalent one, and also doing complement fixation with various other bacteria in order to determine the patient's antibody formation and degree of bacterial infection. Cecil and his co-workers¹³ have stressed the great value of agglutination reactions in the diagnosis and treatment of arthritis and only recently Wainwright³⁴ has used skin reactions to determine the strain of streptococcus to which his patients showed

the maximum skin reaction. This information was used as a guide to vaccine treatment.

In all of our cases we have used a complement-fixation method which one of us has devised to determine the degree of bacterial infection. As this work is highly technical in character, we do not deem it advisable to go into the details at this time. However, the clinical results obtained in the cases treated with vaccines which we have prepared based on the complement-fixation findings have been such that we consider them of great diagnostic value as well as a basis for treatment. These findings have led us to believe that the work of the earlier authors quoted should be carefully reviewed. We believe that it would be quite worth while to consider many of the conditions in horses that are today known as ringbone, sidebone, navicular disease, sessamoiditis, spavin, suffraginitis, and so forth as "chronic equine arthritis."

Dimock and Edwards³⁵ have shown that 26 per cent of fetuses examined showed the presence of streptococcus infection and that 39.8 per cent were infected with *Shigella equirulis*. Thus 65.4 per cent of foals examined at postmortem over a ten-year period showed infection with only two organisms. They state:

In cases of long standing streptococcus infection there was usually a purulent arthritis. The arthritis involved the joint cavities and surrounding tissues. Within the joint cavity the fluid was less viscous than normal, was increased in amount, often blood stained, and in many instances purulent. It was not unusual to find that the joint cartilage was diseased and in many cases eroded.

Animals which were sick for some days before death showed more advanced pathological lesions in the internal organs and joint cavities. Cases infected with *Shigella equirulis* showed various degrees of joint involvement ranging from a slight increase in synovial fluid and a congestion of the joint capsule to a purulent arthritis involving the joint cavity and tendon sheaths with a marked accumulation of fluid and extreme swelling. In some instances one joint showed purulent arthritis while all the other joints were negative.

Dimock and Edwards also found that the hock, hip and knee-joints were more often involved than other joints.

We feel that this work is of the greatest importance, for it clearly shows the extensive involvement of a large percentage of animals that have come under their observation and that these organisms are the most important potential etiological factors in causing what we have termed chronic arthritis in animals. With these specific and common infections in mind, our problem has been two-fold: first, to demonstrate the presence of chronic infection and, second, if demonstrated, to build up the immunity of the animal by the use of specifically prepared bacterial antigens or vaccines together with other supportive treatment, to the end

that there is a marked improvement in the general physical condition of the animal.

In considering the sources of infection which cause arthritis in humans and equines, it is interesting to note certain conditions in the two species which are quite analogous. A majority of research workers who have investigated human arthritis have come to the conclusion that bacterial infection from the digestive tract is responsible in 90 per cent of the cases. A few can be traced to organisms of tonsillar origin, a few from bad teeth, a few from genito-urinary sources and a few from various local foci of infection. The great majority, however, seem to be derived from the digestive tract.

INFECTION OF ALIMENTARY ORIGIN

From the result of our work, we are convinced that in equines a still higher percentage of infection is derived from the alimentary tract. In all probability the most important single factor in carrying infection from the digestive tract to other parts of the body is the great army of intestinal parasites which infest a great majority of horses. The pathological lesions produced during the life cycle of intestinal parasites in horses clearly demonstrate the havoc which these invaders cause in their migration from the digestive tract to other parts of the body. These minute larvae burrow through the mucous membrane of the intestines, they are picked up by the blood-stream and are carried to various parts of the body where they grow and develop. During this migration they carry on their backs, so to speak, all sorts of bacteria found in the digestive tract and these organisms locate at various points of advantage for their growth and development, causing many and varied pathological lesions.

Shigella equirulis is an organism commonly found in the alimentary tract of horses. Dimock and Edwards³⁵ have recovered this organism in pure cultures from the joint cavities of diseased foals and from verminous aneurisms (worm tumors) of the mesenteric arteries. Numerous strains of staphylococci, streptococci and other organisms are frequently recovered from these infected cases. The pathological lesions resulting from these various infections are demonstrated in the form of abscesses of the mesenteric lymph-glands and in the walls of the intestinal tract, in the lungs, liver, kidneys and in other parts of the body which serve as foci of infection and a source of supply for bacteria which are commonly found in arthritis.

Up to the present time, we have tested 460 samples of blood from horses presenting various clinical symptoms of disease. A

majority of these have been arthritics. It is interesting to note the following reactions by the complement-fixation method to these various organisms, generally considered to be non-specific infections. In 17 per cent of the cases a definite reaction to *Pseudomonas aeruginosa* (*Bacillus pyocyaneus*) was obtained. This organism is a common pus-producing organism found in the digestive tract of humans and animals. In 38 per cent of the cases there was a definite reaction to an organism we have known as "viscid rod" and belonging to the same family as the Friendlander bacillus. Sixty-nine per cent showed reactions to various species of staphylococci. In 95 per cent of the cases a definite reaction was produced to one or more of the seven or eight species of streptococci which we have isolated from horses. To our minds this is clearly analogous to the findings of Dimock and Edwards³⁵ in reference to the various percentages of cases infected with these common organisms as determined by bacteriological findings at postmortem.

MICROÖRGANISMS ASSOCIATED WITH ARTHRITIS

While we have not had facilities and material to demonstrate the presence of these various microorganisms in the tissues of mature animals suffering from arthritis, the presence of various species of microorganisms, especially streptococci, has been definitely demonstrated in experiment animals as well as in human subjects in the research work on arthritis in humans. As has already been pointed out in this paper, many research workers have demonstrated the presence of these various organisms in various pathological conditions in young animals that might properly be called acute arthritis. To us it is highly probable that the larvae of many intestinal parasites in pregnant mares, in their migration from the intestinal tract to other parts of the body, may be the carriers of prenatal infections which are now definitely recognized as the cause of many diseases of the new-born.

The clinical picture of arthritis in horses is varied. In young animals we have the acute and severe lesions which have long been known as navel-ill, joint-ill, acute streptococcic infection, etc. For the past hundred years or more, we have had a classification of bone diseases in older animals known as spavins, ring bones, sidebones, splints, curbs, etc., depending upon the location of the disease and the particular parts involved. In human medicine, prior to the last decade, we have heard of Heberdeen's nodes, policeman's heel, housmaid's knee, rheumatism of the

hands, feet and every part of the body, lumbago, sciatica, neuritis, etc. This classification is quite comparable to the one used in veterinary medicine today. To our minds this whole classification of bone diseases rightly comes under the heading of *chronic arthritis*. Another picture which is commonly seen in equine arthritis is that where the subject shows evidence of a shifting lameness, apparently lame at one point today, in an entirely different location tomorrow and still at other points a few days hence. The ankle joints in these cases are frequently enlarged, gouty and in some instances show evidence of pain. Frequently there is a cracking noise from various joints when exercised at a walk. Among Thoroughbreds and other sport horses, animals suffering from these conditions are not suitable for training. When training and exercise are forced, frequently these animals become more or less permanently crippled.

Some veterinarians have referred to arthritic cases as being more prevalent in low altitudes and along the seashore where damp, changeable climatic conditions prevail. For many years changing climatic conditions have been recognized as important accessory factors in causing rheumatism in people.

VACCINE TREATMENT PRODUCES BEST RESULTS

In many of the cases that have come under our observation the vaccine method of treatment has produced the best and quickest results. It would be interesting to relate, if propriety would permit, the prompt results obtained in some of the great stake horses which have performed on the American turf during the past few years. In many cases the diseased condition appears to be more acute than is frequently observed in human medicine. In a majority of arthritics among people the cases are of eight to ten years standing. A person will work for years with "rheumatism," complaining a bit, of course, but gradually "warming out of it" as the day goes on and they proceed with their daily duties. A horse suffering from arthritis is immediately lame and gives the owner positive evidence at once. It is against all rules of propriety and ethics to work a "lame horse"; therefore, he is retired for treatment either by the owner, who uses various old-time remedies, or by the veterinarian, who proceeds according to the best dictates of his experience in these cases.

In the majority of cases the horse is fired and blistered. It is a certainty that this method of treatment is only "skin deep" and while considerable inflammation and discomfort to the patient are caused, he is at least rested and, after all, rest and natural processes are the most important factors to produce the

desired results by this method of treatment in these cases. One prominent veterinarian who derived more actual benefit financially from firing and blistering than his patients ever received physically or medicinally has often said, "If I had my way I would fire and blister all horses on the back or under the saddle." (By this method of treatment they at least could not be worked.)

All of these methods of treatment have been practiced for centuries in human medicine the same as in veterinary medicine. In human medicine they have all been discarded. Proper diet, heat (diathermy treatments), proper regulation of the digestive tract, and the elimination as far as possible of foci of infection are the main physical and medicinal avenues of treatment. As previously stated, various methods of treatment by bacterial or vaccine therapy as worked out by various investigators seem to be most successful. During the past ten years, the method described and worked out by Burbank and his co-workers,¹⁰ and which is similar in principle to the method which we are employing in the treatment of equine arthritis, seems to be the most successful of all.

METHOD OF DIAGNOSIS AND TREATMENT

This method of diagnosis and treatment is not at all complicated and can be outlined briefly as follows: A sample of blood, one-half to one ounce, is drawn from the jugular vein in an aseptic manner in a clean, sterile bottle. It has seemed advisable in drawing blood to fill the bottle completely and insert the cork in such a way that there will be no air in the bottle, or at least as little as possible. The sample is allowed to stand for a short time. The white corpuscles or "buffy coat" rapidly come to the top, the blood congeals and after a short time the clot contracts and an abundance of clear serum is expressed. This clear serum is used in making the complement-fixation test for some 12 or 15 definite species of organisms which we have isolated from various types of infection in horses. From the organisms to which the serum gives positive reactions a bacterial antigen or vaccine is prepared, in proportion to the degree of reaction, and this antigen is then injected subcutaneously into the patient in small doses at four to six-day intervals. It is our belief that one very good reason for the beneficial results obtained in many of these cases is the specific nature of the antigen. While it varies from autogenous vaccines or antigens, it is nevertheless, specific in that the organisms used show specific reactions to the blood of each individual patient. In the successful treatment of human patients by Burbank^{26, 27} and others, this principle seemed

to be essential and a most important factor in the success of this method. In addition to the use of these specific antigens or vaccines, horses suffering from arthritis should be properly and thoroughly treated for intestinal parasites. The diet should be regulated to contain a moderate amount of proteins and should be reinforced with elements containing a liberal amount of calcium and phosphorus together with vitamins, especially A and D, which are so essential to general health and the assimilation of minerals so essential to bone development.

THREE CLASSES OF CASES

A résumé of the 460 cases, from which we have tested samples of blood, shows rather definitely what we have been able to accomplish during the past six years. These cases may be classified under three rather general headings as follows: First, we have young animals suffering from conditions which might be considered comparable to acute rheumatic fever and commonly known in veterinary literature as prenatal infection, streptococic infection, navel-ill, joint-ill, etc. While we have had only ten cases of this character, it is interesting to note that they all made a satisfactory and apparently permanent recovery. Two cases are especially worthy of note. Two Thoroughbred foals were brought to the attention of one of us on a large breeding farm. They were both suffering from extensive inflammation of the knee, hock and ankle joints. The joints were hot and swollen and apparently contained excessive fluid. The knees and ankles were badly distorted; the flexor tendons were apparently much contracted and both cases were extensively "over on the ankles." In consultation with the manager of the farm it was suggested that in all probability these two cases were not suitable for treatment and destruction was rather half-heartedly recommended. In view of the potential value of these foals, due to their exceptional blood-lines, it was finally decided to attempt treatment. Blood samples were taken. One sample (foal 388) gave a strong reaction to *Ps. aeruginosa*. (*B. pyocyaneus*), an organism which we have termed "viscid rod" (one of the Friedlander group and previously referred to), and strong reactions to two strains of streptococci. The other (foal 389) gave a strong reaction to viscid rod, *Staphylococcus aureus* and the same strains of streptococci. Radiographs revealed no serious bone involvement. Specific bacterial antigens were prepared as soon as possible and administered in 1-cc doses every three or four days for 20 injections. Both of these cases immediately began to show marked improvement and proceeded to make very satisfactory and un-

eventful recoveries. One of these foals was sold as a yearling in the annual summer sales for more than \$2,500.00 and the other was retained in the racing stable and is considered today one of the good prospects in the barn. It has been our experience that this type of case is especially responsive to this method of treatment.

A second class of cases, by far the most numerous from the standpoint of numbers, includes those showing evidence of arthritis due to joint enlargement, shifting lameness, gouty ankles, etc. We have had many instances in this type of arthritis where most satisfactory improvement and recovery were obtained. Several high-class stake horses have appeared in this group. In many cases, that could have been conscientiously fired and blistered, marked improvement has prevailed in less than 30 days; the animals have continued in work and satisfactory recovery, as gauged by subsequent performance and important races won, has prevailed.

A third class of cases that has come under our observation include those of pre-natal infection, in which the foal shows evidence of acute infection very early in life. It is interesting to note that in several instances of this type the dam and the foal usually react to the same organisms. We are at present carrying out some research work in cases of mares that give birth to foals year after year that manifest an inherited weakness or susceptibility to infection. It is our purpose to determine if possible whether such conditions may be prevented by the use of specific bacterial antigens and proper supportive and systemic treatment of the dam.

FOURTH TYPE OF ARTHRITIS

A fourth and very common type of arthritis in horses is the group which comprises a majority of foot lamenesses caused by sidebones, ringbones and navicular disease. Assuming that chronic arthritis is due to infection and that these three important causes of lameness are forms of arthritis, it is entirely plausible to assume that this type of treatment, if successful, would be beneficial in these cases. A few cases have been presented for treatment. Radiographs have demonstrated the presence of active arthritis in these various forms. In a few instances most satisfactory results apparently have been obtained. While the number of these cases treated is entirely too small to permit the drawing of any definite general conclusions, the cases thus far treated seem to indicate a most interesting and possibly successful result in this type of arthritis.

In presenting this subject to the profession, it is our sincere wish that we may have the coöperation of others who may be interested in this field of veterinary practice. It is our belief that chronic equine arthritis is quite comparable to human arthritis as far as etiology and treatment are concerned. We are convinced that the methods of treatment that have proved to be so successful in human medicine are equally applicable in this field. We hope that more humane methods of treatment may be adopted, that the torture of the firing-iron, the twitch, the lip-rope and the blister may be supplanted by the methods, so successful in human medicine, that begin fundamentally by eliminating the cause of the disease. In order that we may not be misunderstood, we fully realize that there is a very small percentage of cases where actual cautery (the firing iron) and strong counter-irritants (blisters) are indicated, but in 90 per cent of the cases of arthritis fundamental treatment that eliminates the cause will produce more satisfactory results. The potential value for the show ring, or for exhibition of many a fine animal, is entirely destroyed by permanently disfiguring the skin with the firing-iron.

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Decision in Blackleg Bacterin Suit

The United States Circuit Court of Appeals, in session at Denver, Colo., has reversed the decree of the United States District Court for the First District of Kansas in the suit of the O. M. Franklin Blackleg Serum Corporation against the Jensen-Salsbery Laboratories, contesting the right of the defendants to prepare blackleg bacterin using formalin for killing the cultures and preserving the bacterin, and to make this product available for commercial distribution. This case has been in the courts for several years and the decision in favor of the Jensen-Salsbery Laboratories means that this firm can continue to manufacture and market blackleg bacterin killed with formalin and further improved by the addition of special salts in the medium, according to the formula worked out by Dr. J. P. Scott, of the Kansas Experiment Station.

Doctor Mazzucchi Receives Patent

Under date of January 22, 1935, a patent was issued by the United States Patent Office to Dr. Mario Mazzucchi, director of the Veterinary Department of the Milanese Serum Institute of Italy, for an anthrax spore vaccine suspended in a medium containing about 2 per cent of saponin, the suspension containing at least 1,000,000 virulent organisms per cc. Such a product has been on the market in the United States and in a number of foreign countries for several years under the name of carbozoo, and the reports attending its use have been highly encouraging. The theory in the use of saponin is that this material holds the organisms at the point of injection in such a way that they pass into the system very slowly. Furthermore, this permits the use of anthrax spores of greater virulence than would be safe with the product that is absorbed more rapidly.

CURRENT PROBLEMS IN THE FIELD OF HEALTH*

By FRANK J. JIRKA, *Springfield, Ill.*

Director, Illinois Department of Public Health

I am pleased in having again the opportunity and the honor of meeting with you of the veterinary profession. Your profession, like mine, is associated with a movement that was born of sympathy and nourished in the hope and in the will to make life longer and happier for our fellow creatures.

Most of the problems which constantly develop to perplex you and try your mettle belong specifically to veterinary practice. Likewise the ordinary affairs of medical practice belong particularly to my profession. At times, however, there arise outstanding problems that sweep across the whole broad field of the healing art which your profession and mine must jointly meet and combat in behalf of the public good.

ANIMAL EXPERIMENTATION

Among these are two or three outstanding matters about which I wish to speak. The first is that of animal experimentation. In his search for truth the medical scientist with a test-tube to light his path and a dissecting knife to trim his lamp has led his profession out of the wilderness of superstition and away from the underbrush of ignorance. These two, the test-tube and the dissecting-knife, have been the basic tools with which medical science has blazed the path away from the dark practices of incantations and blood-letting and out of the quagmire of a belief in evil spirits and miasmatic influences as the major factors in the causes of disease in man and beast. Now there is a threat to take away from this profession one of these tools, the dissecting-knife.

It seems almost superfluous to recite the advantages which have come into the practice of healing and disease prevention from animal experimentation. The skillful knife of the surgeon in connection with the most important operations on man and beast is guided almost exclusively by knowledge gained from that fertile source. Diphtheria, the mortality from which has been reduced from 1,000 to 100 deaths per year in Illinois, is under control as a result of animal experimentation. From work on the dog, Dr. Banting was able to give insulin to the world, a product that makes possible the control of diabetes. Nearly all

*Presented at the fifty-third annual meeting of the Illinois State Veterinary Medical Association, Springfield, February 19-20, 1935.

that we know about vitamins and other factors of nutrition came from experiments on animals. Our knowledge about the circulation of the blood and the function of the digestive system has come more from experiments and observations of animals than from any other source.

We know how to control bovine and human tuberculosis, especially through the use of vaccine, as the result of animal experimentation. The scourge of rabies can be and is controlled because of knowledge gained through animal experimentation. Many drugs have been developed and the appropriate dosage determined by experiments performed on animals. The dosage of diphtheria toxoid, for example, the preparation used for immunizing children against that disease, is measured by experimenting on small animals. Progress in perfecting a scarlet fever vaccine has been greatly obstructed because lower animals are not susceptible to the disease and thus the effects of vaccine may not be determined in that way.

These brief references suggest the magnitude of benefits to human and animal health which have been derived from animal experimentation. The future, however, holds out the promise of more important discoveries than have yet materialized from this fruitful source of new scientific truth. Dr. Ivy, for example, is at work on peptic ulcers. His studies have progressed to the point where he feels sure of important discoveries that will aid in the effective treatment of that very common ailment. The use of dogs is imperative in going forward with that research.

Knowledge about the ductless glands is still shrouded in mystery although their importance to health and vigor has been demonstrated. Advancement in this field must be made, if it is made at all, through the door of animal experimentation. Cancer, which stalks like a ghost to and fro in the land of the upper age brackets, is an unsolved problem that offers a fertile field for research. Here again animal experimentation is of the utmost importance in the hope of advancement.

In the face of all that has been accomplished and all the possibilities whose shadows are already visible upon the horizon of knowledge we find ourselves face to face with the almost incredible demand for prohibiting this fertile means of research.

There is a movement on foot, born of sentimentalism and cultivated by misplaced philanthropy, which would take away from medical science one of its basic tools, the privilege of animal experimentation. Supported by heavy endowments that provide an income from a permanent fund of \$8,000,000, the leaders

of this movement are playing Santa Claus with themselves while appealing to the gullible sentimentalism of thoughtless followers.

These people would prohibit animal experimentation in scientific laboratories while multitudes of cats and dogs are constantly cruelly abused in countless ways in every community and throughout the rural districts of our land. Puppies and kittens without number are drowned and otherwise disposed of every day by people who already have too many. Every neighborhood can tell stories of clandestine dog-poisoning episodes. Every community has experienced the plague of dog and cat nuisances. Every city has a dog pound, the child of necessity, born of a demand for some systematic means of protecting the community against ownerless curs which nobody wants.

At these facts the anti-vivisectionist winks. His object is to rob the medical and allied professions of a basic tool sharpened for the service of humanity. For some strange reason these people would kill the goose that lays the golden eggs of medical advancement while winking at the crows of mischief in the field of animal abuse.

If the anti-vivisectionists were sincere in their desire to help the lower animals, they could spend their money and time to much greater practicable value by promoting a birth-control campaign for dogs and cats. While fraught with difficulty and obstacles, the income from \$8,000,000 per year would do a lot in educating dog and cat lovers to limit the number of births. This could be accomplished in many ways.

While there is abroad in the land at the moment some agitation in favor of reforming the system of medical practice, it may be observed that humanity has placed in those who practice the healing art a superlative degree of confidence. The man who will not trust a lawyer out of speaking range hands over his life to the keeping of a surgeon when a major operation is prescribed. The mother who looks with skepticism on the merchant's cans and doubts always whether the grocer's scales are properly adjusted will take in all confidence from her family doctor a bottle of medicine made up of she knows not what. The banker who demands the last farthing of security for his money, even of his best friend, will turn over his life or that of his child to a doctor with nothing but faith in his skill and integrity as a promissory note. The manufacturer who requires bills of sale and satisfactory credit ratings for his goods will accept on faith the prescriptions of a physician when health and life are at stake. Insurance companies take the word of a doctor as the court of last resort before accepting a risk or paying a claim. The cattle-

breeder who takes nothing for granted from the lawyer or banker or merchant will turn over with implicit confidence to the veterinarian his champion bull when the question of his welfare is at stake.

This high level of integrity which characterizes the individual relations between doctor and patient and between veterinarian and stock-owner has been carried over into public affairs. Our sensibilities have been severely shocked at occasional national scandals which have originated in those federal governmental departments where lawyers and politicians hold sway, but yet no breath of national scandal has ever attached to the federal Public Health Service or to the Bureau of Animal Industry, which are manned chiefly by members of your profession and mine.

In Illinois state affairs the story is similar. We have had in the past occasional scandals in certain departments of state governments but no scandal of significant magnitude has ever found birth in the State Department of Public Health or in the Division of Animal Industry, the affairs of which have been always in the hands of physicians and veterinarians. This has been the experience throughout the length and breadth of our land.

History has recorded many reformations that have taken place in order to cleanse the ranks of one professional group after another. Reformations have taken place in economic systems, in banking systems, in transportation, in industry, yes and even in religion.

While these things have transpired in the religious, industrial and commercial worlds, the system of medical practice has remained exceptionally free from violent changes and cleansing reformations because it is built upon a high ethical foundation and upon the solid basis of science. It has marched steadily upward and onward, seeking new truth in the spirit of science and accepting new theories only upon demonstrated evidence of truth and efficacy.

This is the picture, a situation with profound importance to physicians, veterinarians and all other branches of the medical profession. Plans have been made to introduce anti-vivisection bills in the legislatures of 32 states during the current year. They aim primarily at prohibiting the use of dogs for experimental purposes. That objective gained, however, will be used only as a stepping-stone to the prohibition of all animals in research laboratories. If the bills introduced this year are enacted into law, the next step will be to add an anti-vivisection amendment to the Constitution of the United States. The fight is on. It is a battle between science and sentimentalism, between

progress and decay, between the forces of construction and the forces of destruction. It is a conflict between progress and retrogression. It will not end this year nor next. The conflict is perpetual and the program of advancement must be planned on a permanent basis.

In this movement the veterinary profession is concerned not only as a body of scientific men but as citizens who prefer science to sentimentalism with respect to their own health problems as well as those of lower forms of life. To rob the research worker of a basic means of study will be a declaration that veterinarians and physicians alike have reached the peaks in medical knowledge from which no problem is hidden from view.

MILK

If the veterinary and public health professions have common ground for combating anti-vivisection, they also are involved no less jointly in the problem of milk control. Both the sanitary and nutritional character of milk is influenced greatly by the health and care of cattle as well as by the methods of production. In the eradication of bovine tuberculosis the veterinarians have already made a substantial and significant contribution to more favorable health conditions in Illinois. Since the campaign against bovine tuberculosis began in this state, the mortality from tuberculosis among children, who are most frequently affected by the bovine bacillus, has declined 50 per cent, while that among adults has declined much less rapidly. This is valid evidence that the work of veterinarians in eradicating tuberculosis from the dairy and breeding herds of the state has already borne fruit in the prevention of human ills.

Recent developments which make possible the enrichment of milk with vitamin D have opened up an entirely new field of service for the joint activity of veterinarians and the public health profession.

The possibility of making milk rich in vitamin D opens up to the industry a market formerly limited to cod-liver oil and similar products. Demonstrations have shown that milk enriched with vitamin D will prevent rickets in infants fully as effectively as does cod-liver oil. Veterinarians have the opportunity of doing pioneer work in this field where they can advise producers on the best methods of feeding in order to yield a satisfactory vitamin D milk.

The evaporated milk industry has been quick to appreciate the importance of irradiation with respect to market demands. Housewives have already been attracted by the irradiation sign

on the cans. Since 1930, the sale of evaporated milk has increased 26 per cent while that of fresh milk fell off 4 per cent.

The evaporated and dried milk industries also threaten the fresh milk market from a sanitary standpoint. When epidemic outbreaks are traced to contaminated milk, housewives turn to canned milk for their supplies. Veterinarians are in a particularly advantageous position to promote better sanitation on the farms.

DISEASES TRANSMISSIBLE FROM ANIMALS TO MAN

The joint responsibilities of veterinarians and public health officials extend also into the field of communicable disease control. Numerous diseases may be transmitted from animals to man. Among these, tuberculosis, undulant fever and rabies are the most important. The control of these diseases requires the closest coöperation between public health and veterinary workers. Bovine tuberculosis has been practically eradicated from the dairy and breeding herds of Illinois. This achievement of the veterinary profession shows how great may be their influence in health protective service.

Unlike tuberculosis, undulant fever is a rising instead of a falling disease. A decade ago, undulant fever was scarcely heard of in this country. Today upwards of 4,000 cases are reported annually in the United States. Since 1926, the recognized incidence in Illinois has climbed from five to more than 100 cases annually.

While undulant fever now manifests a low grade of infectivity, there is no assurance that this happy state of affairs will continue. The history of all epidemic diseases of major importance is that they began insidiously, climbed gradually to great magnitude and then declined. Leprosy was once the plague of civilized humanity. Cholera has swept both Europe and America in deadly and devastating waves that ceased only within the memory of men still living. Malaria has been a disease of the first magnitude among civilized peoples. Tuberculosis reached the peak of its rising tide and had already begun to decline before the anti-tuberculosis movement began. Smallpox, even when not prevented by vaccination, is usually a mild, inconsequential disorder now, compared with what it formerly was.

The prevention of these and other diseases, moreover, opens the way to new and less aggressive ailments. While much can be done to prevent infections and promote health, let no one believe that human creatures will ever arrive at the utopian paradise where no diseases prevail.

Under these circumstances it is entirely possible that undulant fever may become a major problem of human health. Bang's disease is already a problem of great consequence among cattle. This situation offers an opportunity for veterinarians and public health officials to coöperate with great advantage from the standpoints of both health protection and economy.

While a large and difficult task, Bang's disease can be eradicated from the herds of Illinois. In the meantime, undulant fever can be controlled through such measures as the pasteurization of milk and hygienic habits on the part of those who come into direct contact with cattle and swine.

Rabies is a difficult and costly disease. Last year the State Department of Public Health spent nearly \$10,000 for vaccine in order to provide the Pasteur treatment for 1,820 indigent people who had been exposed to the disease through dog bites. Doubtless a substantial economic loss was sustained by stock-owners because of rabid dogs.

The status of public health, moreover, is closely related to economics. Prosperous communities can take advantage of preventive medicine in many ways that are denied the people of low income. In promoting the health and productivity of domestic stock, the veterinarian makes possible a higher standard of living. Thus he contributes both directly and indirectly to more favorable human health.

At every point in their professional functions the veterinarian and the health officer find a common purpose. Both aim at the conservation of life and health. Both work in a highly technical scientific field. I would have them coördinate their efforts for the greater good.

Let every veterinarian and every physician be mindful always of the high purpose and the unsurpassed integrity of the profession to which he belongs. Let each be zealous in protecting the freedom of research. Let each be ever alert to contribute individually and coöperatively to the advancement of the matchless field of service in which we find ourselves at work.

Be Kind to Animals Week, which was first celebrated in 1915, will be observed this year from April 8 to 13. Humane Sunday will be observed on April 7.

The disease of an evil conscience is beyond the practice of all the physicians of all the countries in the world.—GLADSTONE.

A LIVE-GERM VACCINE FOR BANG'S ABORTION DISEASE OF CATTLE

Preliminary Note*

By CHARLES H. KITSELMAN, *Manhattan, Kan.*

Department of Veterinary Pathology, Kansas State College

The author, working at the Kansas State Agricultural Experiment Station, has developed a strain of *Brucella abortus* var. *bovis* which does not produce agglutinins in cattle following the injections of massive doses of a vaccine prepared from it, although a thermal response is noted following each injection. Cattle that are negative to the agglutination test for Bang's disease remain completely negative to the standard test (rapid and tube) following vaccination.

The so-called Huddleson strain of *Brucella abortus* causes the production of agglutinins for at least a short period of time, although it is claimed that this organism will not localize in the body of an animal as the result of vaccination. The newly developed strain, when used for preparing a vaccine, differs from the Huddleson strain in that no agglutinins are produced for even a brief period of time, and this fact should tend to render such a vaccine of considerable value for conferring protection against Bang's disease in those herds which are accredited or are in the process of becoming accredited.

Experiments are being planned with a view to determining the protective and immunizing value of this vaccine in cattle under conditions which will approximate actual conditions in the field.

*Received for publication, March 8, 1935.

Road Maps to Oklahoma City

For those who are planning to go by automobile to the meeting of the A. V. M. A., at Oklahoma City, Okla., August 27-30, the Conoco Travel Bureau, of Denver, Colo., offers a complete trip-planning service. It supplies a road map of all the states through which the trip is made, with points of interest along or near the route noted. It provides travel booklets, and a set of complete hotel and camp directories. With all this goes an official Conoco passport, which assures the motorist of special attention from the attendants at Conoco service stations along the way.

CLINICAL AND CASE REPORTS

A decorative header box containing the title 'CLINICAL AND CASE REPORTS' in a bold, serif font. To the left of the title is a small illustration of a vintage car, and to the right is a small illustration of a person, possibly a veterinarian, attending to an animal.

A NEW CHEMOTHERAPEUTIC METHOD IN SMALL-ANIMAL PRACTICE*

By CHARLES HOEFLE, Mount Vernon, N. Y.

It is desired to make this preliminary report of a new drug, or a combination of drugs, which I have been using very successfully in my practice on cases where no other available method of treatment appears to be effective. I believe that in the method to be reported we have something very much worth while. It appears to be especially adaptable to small-animal practice, but not necessarily limited to that field.

The product used is a complex chemical compound called pyferol. It is primarily intended for the treatment of tumors and allied conditions, and is based on the principle of correcting cell respiration. It is administered intravenously and locally, or by either method alone, as the individual case may warrant.

The new therapeutic agent consists of two solutions which are mixed in the syringe just before infection. One is a solution of a complex ferric salt and the other is a dye known as pyrrol blue, or isamine blue. The mixture of the two solutions is not stable and, for that reason, each solution must be prepared separately and mixed just before use. The exact chemical formula of this compound is not known, as it is of a rather complex nature. Yet, it can be produced and reproduced exactly and as often as desired.

The following case reports may be of interest:

CASE I

Subject: A Scotch Terrier, male, brought to me on April 8, 1934, with an apparent tumor on the right jaw (fig. 1).

History: The owner had noticed the growth a week previously and it had been growing steadily. Figure 2 is an x-ray picture.

Treatment: On the day of admission 2 cc of the product was injected intravenously, and this treatment was repeated on April

*Received for publication, December 19, 1934.

12. On April 16, the growth was not any larger, nor did it appear to be any smaller. The condition remained the same after one more injection, so I advised an operation, thus making a biopsy possible.

After making a small incision I found the growth so bony and involving so much of the jaw-bone that there would have been



Fig. 1. Case 1 showing enlargement on the right jaw.

insufficient to hold had all of it been chiseled away. A small piece was taken for biopsy and the wound sutured. Because of the incision, I could not place any substance around the bone, and the hardness of the growth made impossible the introduction of a needle. Healing was rapid and in four days a local injection was made against the bony growth. Sloughing of tissue through the wound, which was not entirely healed, was the result.

At this time the bone was found to be much softer and apparently somewhat spongelike when touched by the needle. I could

now inject about 0.5 cc of the fluid into the bone and make it stay there. In three days an intravenous injection of 2 cc was given, and on the next day it was followed by a local injection with nearly 1 cc being retained. Three days later, the growth was found to be noticeably smaller, but not very much so. The increased ease of local injections held my interest and I kept on, finally being able to inject 1.5 cc so that this would be retained.

The tumor, revealed by microscopic examination to be an osteoma (fig. 3), gradually reduced, and soon I could get little or none of the solution in locally, as it again hardened very much



FIG. 2. X-ray picture of jaw of case 1.

like normal bone. The owner became so anxious to get the dog home that I reluctantly let it go. The patient was released on May 12, but was followed up by phone for a month, when the owner went north for the summer. He reported that progress was satisfactory.

The dog was not again available for examination until October, when the photograph (fig. 4) was taken. It shows the outline of the jaw with the hair wet down, as the owner would not allow it to be cut. Another examination was made in the middle of November. At that time it required some effort to find any sign of any disturbance by manual examination. The x-ray picture (fig. 5), taken on the same date, illustrates the condition of the jaw. The dog is feeling fine and apparently is perfectly normal.

CASE II

Subject: A Wire-Haired Fox Terrier, female, presented on Thanksgiving Day of 1933, as a dystocia patient. She had had six pups, but was unable to deliver the last one. Cesarean section was necessary and a pup larger than the rest and bent backward was found in the left uterine horn. Everything else was apparently normal. Recovery was quite uneventful and she raised all but one of the litter. On February 15, 1934, she was brought in and was reported as being unable to jump up onto a chair.

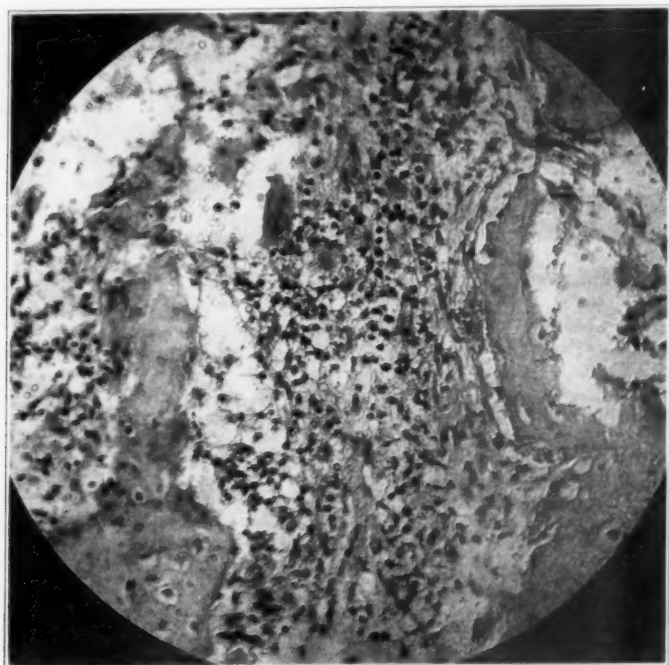


FIG. 3. Photomicrograph of section of osteoma (case 1).

History and symptoms: Apparent indigestion with toxemia and two small lumps in the abdominal cavity, one about the size of a hazelnut and the other like a kidney, except that it was too low for a floating kidney. Pain was indicated when the patient was squeezed, but otherwise showed only the indigestion and a marked loss of weight. A prescription was given, the owner advised, and the patient sent home. She was returned on February 27, as nearly dead and hopeless. I suggested that the dog be left at the hospital and that an attempt be made to remove the

tumors which had grown very much in such a short time. There was apparent pain on palpation of the abdomen at almost any



FIG. 4. Photograph of case 1 about six months after treatment.

point. The temperature was 104°F. A blood-count made on February 28 resulted as follows:

Red blood corpuscles.....	4,556,000	
White blood corpuscles.....	30,400	
Lymphocytes		4.0 per cent
Mononuclears, small		1.5 per cent
Mononuclears, large		5.0 per cent
Polymorphonuclears		84.5 per cent
Eosinophiles		5.0 per cent

The average normal count of about 16 investigators, according to Fish, shows red blood corpuscles 6,240,625, and white blood corpuscles 11,370.

Operation and treatment: Laparotomy showed such an inflamed condition of the abdomen and its contents, with considerable serous exudate, that even to touch any part resulted in

hemorrhage. It looked like a case of carcinoma observed by me at one time in a human patient. A small section of the omentum was taken for biopsy and there was so much difficulty in checking the hemorrhage that we were obliged to close the abdominal wound and go no further. Stimulants and heat were applied and 2 cc of the compound was injected intravenously for its tonic value if nothing else. The dog lived although we gave no hope for her recovery. She continued to survive and we continued injecting 2 cc of the injection intravenously twice a week. Gradual

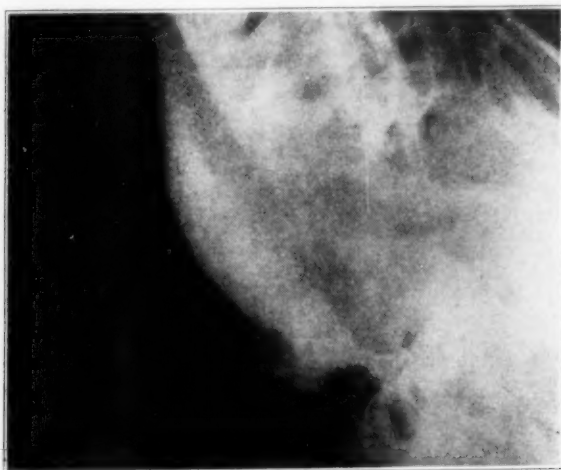


FIG. 5. X-ray picture made on the same date as the photograph in figure 4.

improvement followed and on March 21 she was so well that we made another blood-count which was found to be as follows:

Red blood corpuscles.....	7,808,000
White blood corpuscles.....	21,200
Lymphocytes	18.0 per cent
Monocytes, small	6.0 per cent
Monocytes, large.....	3.5 per cent
Polymorphonuclears	64.0 per cent
Transitional	2.0 per cent
Eosinophiles	6.5 per cent

The red count was above normal and, although the white count was one-third less, it was still too high. It was possible to see gradual improvement, so the treatment was continued as before until April 17, when a final count was made and the dog discharged as cured. She reached what appeared to be her normal level, namely, red blood corpuscles 5,816,000 and white blood corpuscles 7,600.

The two tumors in the lumbar region disappeared entirely and the dog appeared to be normal in every way. An interesting observation was made during the treatment. This dog, when admitted to the clinic, had a stubborn lesion on the left side of the neck which would not yield to the usual treatment (fig. 6). This lesion healed completely after three intravenous injections of the compound. This dog has since been in season, was bred and gave birth to five normal, healthy male pups.

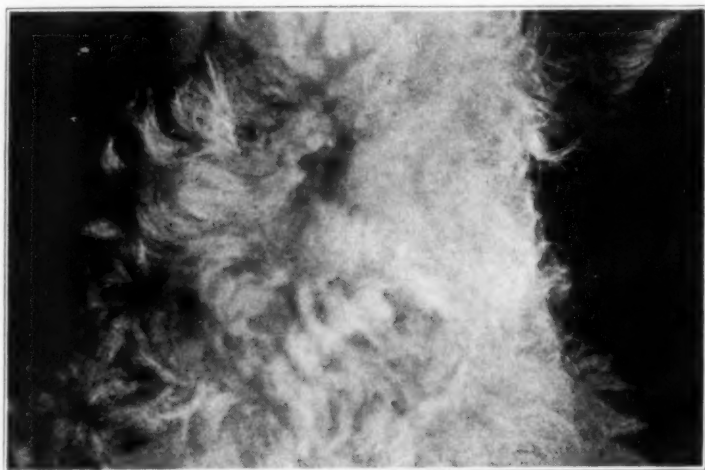


FIG. 6. Photograph of skin lesion on the left side of neck of case 2.

COMMENT

In concluding this preliminary report I wish to say that the method described here was found to be very effective in the treatment of the conditions reported, even though started at apparently hopeless stages.

In the treatment of tumors one should keep in mind that an animal may die of toxemia, the result of the absorption of toxic elements, elaborated by the tumor while undergoing disintegration, no matter by what method this is obtained. Surgery whenever possible, followed by the use of this product to destroy the remaining tumor tissue and to prevent recurrence, would appear to be the best procedure. However, in cases where surgery is not practical, or is hopelessly impossible, nothing can be lost and there is everything to be gained. The animal need not be hospitalized, or it may be, as the owner may wish, or as the conditions suggest. The treatment is simple and requires only an ability

to inject the compound intravenously. This procedure may be difficult for some when small veins are selected. It surely was for me when I first tried it. However, we all remember xylol used in our college courses in bacteriology. Just wet a piece of cotton with xylol and rub it over the vein. This will enlarge almost as much as you wish, according to how long and how thoroughly you rub it. It enlarges at only one point and for only a short time, and you get no undesirable after-effects.

Undoubtedly, it was due to the unusual physiological properties of this compound that such results were possible in these apparently hopeless cases. I hope that this review of my experience will be helpful to veterinarians who face similar problems. I have a number of other cases under treatment and expect, later on, to give a more complete and perfectly verified report of my findings on the product employed and its uses.

THIRD OUTBREAK OF PARATYPHOID DYSENTERY IN LAMBS*

By I. E. NEWSOM and FLOYD CROSS

Section of Pathology and Bacteriology

Colorado Agricultural Experiment Station, Fort Collins, Colo.

Although it has been eleven years since we reported the first outbreak of paratyphoid dysentery in sheep, our search of the literature reveals no further cases except those reported by ourselves. With a disease of such rarity, it seems worth while to record the third outbreak observed by us.

We first described the disease in 1923,^{1,2} in which 30,000 lambs were involved, with a death loss of 6.2 per cent. The second outbreak occurred under similar conditions in 1,600 lambs in the fall of 1929.³ The loss in this instance was only 30 head. The outbreaks previously described followed considerable delay in transit, with a consequent lack of feed. The third one is similar to the others in history, since it comprised 1,500 lambs loaded at Sterling, Tex., on October 11, 1934, and arriving at Ault, Colo., six days later. There 900 of the lambs were sent to one farm and 600 to another in the same vicinity. Of the first lot, it was noticed that many of the lambs were scouring on arrival. Two died during the first night and 14 the next. On October 19, the owner brought two dead lambs to our laboratory for examination. There was evidence of considerable scouring but the feces

*Received for publication, February 2, 1935.

contained no blood. Examination revealed a very severe inflammation in the fourth stomach and in the small intestines. This condition did not extend into the cecum or large intestines. Examination of the cecal content for coccidia was negative. Pure cultures of *Salmonella aertrycke* were isolated from the spleen.

On the following day, the place where the outbreak occurred was visited, and it was noticed that 25 or 30 animals were scouring, several were dead in the pens and many showed evidence of depression and loss of appetite. Three temperatures were taken, running as follows: 106.6, 104.5 and 105.4. One lamb on post-mortem showed a severe inflammation in the small intestines and fourth stomach, but again the inflammatory reaction did not extend into the cecum or the large intestine. Cultures from the heart-blood and spleen of this animal gave pure cultures of *S. aertrycke*. The disease continued for some three weeks with a total loss of 85 head. Unfortunately the owner seemed very much discouraged and as a consequence little was done to improve the conditions. Dead lambs were allowed to lie in the pens and no attempt at isolation of the sick animals was made. In the second lot of 600 the disease was a little slow in developing, no sick animals appearing until the fifth or sixth day after arrival. It seemed to run a milder course and the total loss was 26.

On November 5, 18 days after the arrival of the lambs, blood was drawn from eight in the first lot and four in the second. Lambs were selected that were believed to have recovered from the disease. Serum from these animals was run against antigen made from our old culture 160, which had been isolated from the 1923 outbreak, and also from the culture which we had isolated in the present instance. Table I shows the results. Two tests were run in each instance but the readings were approximately the same.

The most striking result of this test was that lambs 1, 3 and 6 showed a moderate agglutinin content for the old strain but not for the new. The negative results on both strains with serum from lambs 2, 9 and 10 can be explained only on the assumption that these animals had not suffered from the disease. That is not surprising, since we had no very accurate way of determining that point.

DISCUSSION

The predisposing cause of paratyphoid dysentery in sheep has appeared in each instance to be a long railroad journey with insufficient feed. The limited observation in this outbreak indicated that the disease was confined to the fourth stomach and the small

TABLE I—Agglutination tests with old and new strains.

LAMB	OLD STRAIN						NEW STRAIN					
	1:50	1:100	1:200	1:500	1:1,000	1:2,000	1:50	1:100	1:200	1:500	1:1,000	1:2,000
1	+	+	—	—	—	—	—	—	—	—	—	—
2	—	—	—	—	—	—	—	—	—	—	—	—
3	+	+	±	—	—	—	—	—	—	—	—	—
4	+	+	+	+	+	—	+	+	+	+	+	+
5	+	+	±	—	—	—	—	—	—	—	—	—
6	+	+	±	—	—	—	+	+	+	—	—	—
7	—	—	—	—	—	—	±	—	—	—	—	—
8	+	+	+	—	—	—	+	+	—	—	—	—
9	—	—	—	—	—	—	—	—	—	—	—	—
10	+	+	—	—	—	—	—	—	—	—	—	—
11	+	+	—	—	—	—	+	±	—	—	—	—
12	—	—	—	—	—	—	+	±	—	—	—	—

intestines, whereas in previous outbreaks inflammation was found also in the cecum and colon. No evidence of blood was seen in the feces, which differentiates this condition from coccidiosis.

Not only has the disease been rarely described in this country but we can find no reference to it in European literature since the rather startling outbreak in 1919,⁴ from which animals were used for human food, resulting in more than a thousand cases of food poisoning in man.

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- ⁴Bruns and Gasters: *Zeit. f. Hyg.*, xc (1920), p. 263.

Missouri Goes in for Geese

Missouri now ranks fourth in the production of geese, according to the *Missouri Farmer*. Since 1910, geese production in the United States has passed from the South Central to the North Central states. This shift is attributed to the fact that geese were formerly produced in the South mainly for the feathers, and now that the demand for feathers has declined in that section the production of geese has been abandoned.

The world's largest high gravity oil field lies partly within the city limits of Oklahoma City.

ABSTRACTS



STUDIES ON THE B VIRUS. The experimental disease in *Macacus rhesus* monkeys. Albert B. Sabin. Brit. Jour. Exp. Path., xv (1934), 6, p. 321.

The B virus is pathogenic for *Macacus rhesus* monkeys and has been transmitted through four generations by intracerebral inoculation. Intracerebral inoculation of the virus is usually fatal, giving rise to various clinical syndromes. Following intravenous injection of the virus, an exanthem results similar to that produced by the intravenous injection of vaccinia in rhesus monkeys. Intracutaneous injection is followed by acute inflammation with necrosis, which may be hemorrhagic or vesiculo-pustular. Intraperitoneal injection gives rise to an acute peritonitis with occasional invasion of some of the abdominal viscera. Peripheral inoculation of the virus does not lead to any apparent involvement of the central nervous system. Among 13 normal monkey sera, only one was found to contain antiviral bodies for the B virus but the titre in this instance was as high as that of the best hyperimmune serum. The author suggests that failure to establish this virus in the monkeys may have been due to immunity, probably as the result of natural infection.

IMMUNIZATION OF ANIMALS WITH FORMALIZED TISSUE CULTURES OF RICKETTSIA FROM EUROPEAN AND MEDITERRANEAN TYPHUS. I. J. Kligler and M. Aschner. Brit. Jour. Exp. Path., xv (1934), 6, p. 337.

It is possible to immunize animals with formalized suspensions of tissue cultures of Rickettsia, cultures of the European and Mediterranean strains of rat virus were used, and in each instance three injections, equivalent to about one-sixth of a tunica, proved sufficient to induce an effective immunity. Old as well as fresh cultures and freshly formalized suspensions as well as old ones are equally effective for immunization. Failure to induce immunity with dead tissue Rickettsia appears to be due to the insufficient amount of antigen present in the infected tissues. It is suggested that this is the plausible reason of a simi-

lar failure in the case of viruses and that vaccines of virus cultures may offer a solution to the problem of active immunization with dead virus.

THE PRODUCTION OF TUMORS IN THE FOWL WITH A COLLOIDAL SOLUTION OF 1:2:5:6 DIBENZANTHRACENE. I. Berenblum and L. P. Kendal. Brit. Jour. Exp. Path., xv (1934), 6, p. 366.

Repeated injections of a 0.007 per cent colloidal solution of dibenzanthracene in water into the breast muscle of the fowl led to the production of spindle-cell sarcomata in eight of twelve birds which survived more than twelve weeks. The total amount of dibenzanthracene injected was about 1.8 mg. Secondary deposits were found in three birds. Five of these tumors were transplanted in other birds and of these two grew successfully. In one of these inoculated birds metastases were present in the lungs. The administration of kieselguhr together with colloidal dibenzanthracene did not appear to influence significantly the development of tumors. Eighteen months after intramuscular injection of 0.6 mg of dibenzanthracene, none of the substance could be detected in the muscle about the site of injection.

THE BACTERICIDAL AND ANTISEPTIC ACTION OF PRESERVATIVES FREQUENTLY USED IN BIOLOGICAL PRODUCTS, AND THE EFFECT OF THESE PRESERVATIVES ON THE POTENCIES OF THE PRODUCTS. Carolyn Rosenstein and Ida Levin. Abst. Jour. Bact., xxix (1935), p. 6.

A study of the bactericidal and antiseptic action of preservatives frequently used in biological products and the effect of those preservatives on the potencies of the products showed that no one of these preservatives alone completely controls all types of contamination found in biological products. This is particularly true in the case of serums and antitoxic globulins. It was further found that half-quantities of phenol and merthiolate in combination (0.25 phenol and 1:20,000 merthiolate), successively added to serums, antitoxic globulins and toxins, destroyed diphtheroids, *B. pyocyaneus* and staphylococci, whereas 0.5 per cent phenol did not destroy diphtheroids and 1:10,000 merthiolate did not destroy *B. pyocyaneus*, when these preservatives were used singly. The bactericidal action of phenol and tricresol has a tendency to decrease after prolonged storage (10 months), while that of merthiolate and a combination of phenol and merthiolate was apparently unaffected. The potency of the products was not affected by ten months of storage at 5° C. with phenol, tricresol

and merthiolate or the combination of phenol and merthiolate in the dilutions used. Both liquid and solid media are necessary to detect all types of contamination which may be present in bacteriological products.

THE IMMUNOLOGICAL RELATIONSHIP OF PSEUDORABIES (infectious, bulbar paralysis, mad itch). Albert B. Sabin. Brit. Jour. Exp. Path., xv (1934), 6, p. 372.

Pseudorabies bears no immunological relationship to rabies. While possessing many properties in common with the virus of herpes simplex, it is easily differentiated from it by active and passive immunity tests. Certain hyperimmune anti-herpes sera protected guinea pigs from minimal but constantly infective doses of pseudorabies. Four of 14 herpes-immunized guinea pigs resisted a small but definitely infective dose of pseudorabies. A potent anti-pseudorabies serum had no effect on herpes. A partial immunological relationship between pseudorabies and herpes is considered possible. A generic relationship is suggested for pseudorabies, the B virus and herpes simplex.

SLOW LACTOSE FERMENTING BACTERIA PATHOGENIC FOR YOUNG CHICKS. Keith H. Lewis and E. R. Hitchner. Abst. Jour. Bact., xxix (1935), p. 22.

A study has been made of the characteristics of a microorganism isolated from several lots of infected chicks, which exhibited symptoms simulating pullorum disease. The delayed fermentation of lactose served to differentiate it from *S. pullora* and the other recognized fowl pathogens. The organisms are pathogenic for guinea pigs and young chicks and in the latter produce symptoms and pathological changes which resemble those in pullorum disease. Cultural characteristics of the organism are given. Agglutination tests show little antigenic relationship of the organism to *E. coli*, *A. aerogenes*, *S. pullora*, *S. anatum*, *S. aertrycke*, *S. enteritidis*, *S. schottmülleri* and *Proteus vulgaris*.

BRUCELLA INFECTIONS IN WHITE MICE. Charlotte Singer and E. B. Shaw. Abst. Jour. Bact., xxix (1935), p. 44.

In a comparative series it was found that inoculation with 300 million *Brucella* bacteria of the suis type, human origin, was fatal to white mice within four days. Inflammatory and degenerative changes in the mice surviving 30 million, 3 million and 300 thousand bacteria were entirely proportional to the number

of organisms administered. Mice immunized intraperitoneally with vaccine survived a mean inoculation of 400 million organisms of suis type. All controls died. There were no abortions; there was relatively little anatomical change, principally in the spleen and lymph-nodes. Infection persisted for 14 months. In a similar series cross-protection was tested with small numbers of organisms. The immunized animals, reinfected with small inoculum, freed their organs slightly better than controls. The melitensis type was slightly more invasive than the suis or bovis types. There is no striking difference in the sterilization of tissues irrespective of the number of organisms inoculated. Positive cultures were obtained for 104 days (longest period tested). Immature mice, 3 to 4 weeks old, were more capable of disposing of small and large doses of living organisms of any type regardless of whether the others were infected or immunized.

COMPENSATORY HYPERTROPHY OF THE REMAINING KIDNEY AFTER NEPHRECTOMY FOLLOWING TRANSPLANTATION OF ITS URETER INTO THE DUODENUM. Jesse L. Bollman and Frank C. Mann. Arch. Path., xix (1935), 1, p. 28.

With the dog as the experiment animal, hypertrophy of the remaining kidney after nephrectomy is greatly increased by accumulation of urinary products in the blood following transplantation of the ureter so that the urine drains into the duodenum. The kidney increases in weight from 60 to 100 per cent within nine days. The glomerular tufts are enlarged but most of the increase appears to be due to swelling and multiplication of the cells of the tubules in which there is some evidence of early degeneration. Creatinine apparently does not accumulate in the blood under these conditions until degeneration of the kidney appears.

LIGATION OF THE COMMON BILE DUCT IN THE CAT. Harold L. Stewart and Marshall M. Lieber. Arch. Path., xix (1935), 1, p. 34.

Following biliary stasis there is a tremendous volumetric increase in the biliary conducting system with stretching and thinning of the walls; the process extends into the smaller branches although the extrahepatic ducts show the greatest degree of involvement. The biliary conducting system contains dark, thick, ropy bile which later tends to become paler. The canaliculi are distended with biliary thrombi, many of which are extended into the perivascular tissue spaces and sinuoids to be phagocytosed by Kupffer cells and macrophages. Bile pigment in the form of

granules and deposits and in colloidal suspension is present in varying amounts. Regressive changes involve the hepatic cells.

A FREE GROWTH PERIOD OF TUBERCLE BACILLI IN THE GUINEA PIG OMENTUM AS RELATED TO THE HYPERSENSITIVE STATE. C. Eugene Woodruff. Amer. Jour. Path., x (1934), 6, p. 739.

After intraperitoneal inoculation in the guinea pigs the H37 strain of tubercle bacillus is first subject to phagocytosis by polymorphonuclear leucocytes. Then certain of the bacilli grow freely for a period on or in the cells of the omentum without exhibiting any chemotactic influence. At the end of this period, the bacilli again attract polymorphonuclear leucocytes. In guinea pigs that have been rendered hypersensitive to tuberculosis and in normal rabbits free growth of inoculated tubercle bacilli does not occur. The relation of free growth and of polymorphonuclear phagocytosis to resistance in tuberculosis is discussed.

CALCIFICATION IN THE BRAINS OF EQUIDAE AND OF BOVIDAE. E. Weston Hurst. Amer. Jour. Path., x (1934), 6, p. 795.

Calcification of the vessels of the globus pallidus is at least as frequent in middle-aged and old horses as in man at a corresponding period of life; it also occurs in cattle. In neither species can it be correlated with the pathological condition responsible for death. Since similar appearances are met with in monkeys, it seems probable that it may represent a biological phenomenon of some constancy in advancing life in the higher mammals. Unlike man many horses, both young and old, show small calcified bodies in the intima of the larger meningeal arteries. Calcification may sometimes be present in other parts of the central nervous system. The use of the purpurin test, following treatment of sections with oxalic acid, permits recognition of calcium salts in the presence of iron compounds; in the horse both are represented in the degenerated vessels.

AN ATTEMPT TO ASCERTAIN THE BEHAVIOR OF ANAPLASMA MARGINALE IN TICKS TRANSMITTING ANAPLASMOSIS. E. V. Cowdry and Charles W. Rees. Amer. Jour. Hyg., xxi (1935), 1, p. 94.

Consistent failure was experienced in attempts to demonstrate continuity of *Anaplasma marginale* through ticks belonging to series which did transmit the disease. The question as to just what the anaplasma bodies are is discussed with no definite conclusion.

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Regular Army

Major Joseph H. Dornblaser is relieved from further assignment and duty at Fort Bliss, Tex., and will proceed to Fort Reno, Okla., and report to the commanding officer, Quartermaster Remount Depot, for duty.

Captain Charles S. Greer is assigned to station at Lexington, Ky., effective upon completion of his present tour of foreign service and will join that station and report to the officer in charge, Remount Purchasing and Breeding Headquarters, for duty.

Major Oness H. Dixon, Jr., is assigned to duty at the Quartermaster Depot, Chicago, Ill., effective upon completion of his present tour of foreign service in the Hawaiian Department.

Second Lt. Robert A. Boyce, Jr., is relieved from duty at Front Royal Quartermaster Depot, Front Royal, Va., effective at such time as will enable him to proceed to New York, N. Y., and sail on or about May 14, 1935, *via* government transportation, for the Philippine Department, for duty.

Colonel James R. Shand is relieved from further assignment and duty at Fort Lewis, Wash., effective on or about May 20, 1935, and will then proceed to Fort Francis E. Warren, Wyo., and report to the commanding officer for duty.

Army Veterinary Corps Examination

The War Department is contemplating holding an examination to fill existing vacancies in the Army Veterinary Corps sometime in June or July, 1935. There are at present five vacancies. Definite information will be published at a later date.

Veterinary Reserve Corps

Separations

Lashbrook, Worden Graham, Capt., Evansville, Ind., Died Jan. 18, 1935.
Martindale, Earl Columbus, 1st Lt., Coleman, Mich., Died Jan. 18, 1935.

Authorities Claim Misbranding of Worm Remedy

A suit charging that 21 one-gallon cans of Dr. Wright's Wormosol shipped recently to the Indiana Farm Bureau, Inc., at Indianapolis, Ind., from the Dr. Wright Chemical Company, of Chicago, Ill., were misbranded in violation of the Food and Drug Act, was filed in Federal Court, March 12, 1935, by the U. S. District Attorney. The preparation, labeled as an agent for controlling worms in chickens and turkeys, "contains no ingredients or combination of ingredients capable of producing the effect claimed," according to the complaint.

MISCELLANEOUS



Three Generations Watch Over Health of Animals at Cincinnati Zoological Park

"Like grandfather, like father, like grandson," could well be the slogan of the three Stephans, Sol A., Joseph A., and Sol G. Jr., of the Cincinnati Zoological Park, Cincinnati, Ohio, since they are united not only by the close ties of kinship but in their devotion to the animals at the Cincinnati Zoo and in the continued development of the Zoo itself.

Sol A. Stephan, general manager of the Park, is, at the age of 86, the oldest living authority on wild animals. His only son, Joseph A. Stephan, is the assistant general manager, and his grandson, Sol G. Stephen, Jr., is a junior at the College of Veterinary Medicine, Ohio State University, where he is preparing himself to carry on the family tradition.

In 1875, the grandfather was traveling with a circus. The newly-established Cincinnati Zoo bought an elephant from the circus to add to its collection of one tiger and one blind hyena. The oldest Stephan was sent to see the elephant safely established in its new quarters and to stay until a competent keeper could be found. When no keeper was forthcoming, he was persuaded to stay on, and has watched the Cincinnati Zoo grow, under his supervision, to its present position as one of the outstanding zoos in the country.

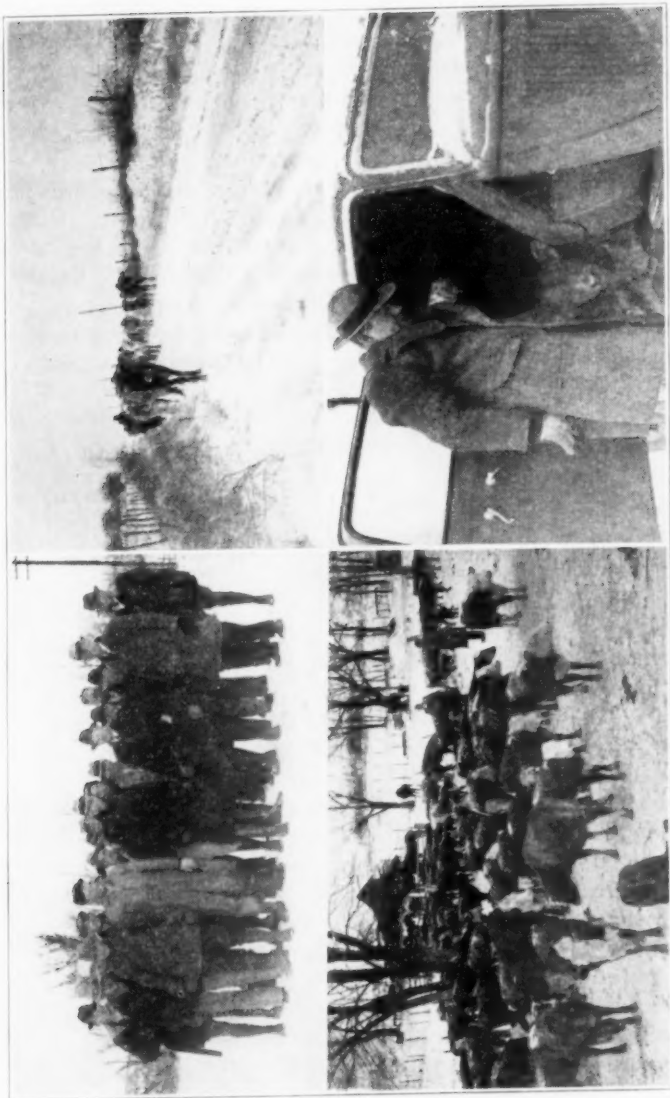
His only son, Joseph A. Stephan, studied veterinary medicine at the Ohio Veterinary College, in Cincinnati, but left before the completion of his course to go with the sons of the famous circus man, Carl Hagenbeck, on a European trip, where he visited the leading zoos on that continent. Later, he was asked by Mr. Hagenbeck to go on to Africa to supervise the buying of the largest known shipment of camels ever to be purchased and transported at one time. While he was away, the Ohio Veterinary College had closed its doors. When he returned, he began to help his father who was extremely busy and, in time, was elevated to his present position of Assistant General Manager, a position he has held for 30 years.

Sol G. Stephan, Jr., is the third generation in this famous line. Since the Cincinnati Zoo has always been his backyard, he naturally is familiar with the habits of wild animals and, in his veterinary course at Ohio State University, is specializing in zoölogical garden work. He says that his decision to study veterinary medicine was influenced largely by the opinions of such outstanding veterinarians as Drs. W. Reid Blair and C. V. Noback, of New York, J. A. Campbell, of Toronto, and Reuben Hilty, of Toledo, that "the naturalist and the experienced practical zoölogical director are better judges of wild-animal conditions than is the veterinarian unless he be at the same time a naturalist or a practical zoölogical director with long experience in that field." The youngest Stephan finds it interesting to observe how well the veterinary curriculum is adapted to preparing him for his prospective activities in the zoölogical field.

Speeding Up Tuberculosis Eradication in Oklahoma

The week beginning January 21, 1935, will be long remembered in Delaware County, Oklahoma. On Monday and Tuesday of that week, exactly 26,131 cattle were given the tuberculin test. Approximately 16,000 cattle were tested the first day, in the northern half of the county, and 10,000 the second day, in the southern half. All testing was done in zero weather, by 35 veterinarians who had been chosen especially to perform this colossal task. The leaders in the drive to clean up the herds in Delaware County were Dr. L. J. Allen, inspector-in-charge, U. S. Bureau of Animal Industry, Dr. O. E. Robinson, district supervisor of tuberculosis-eradication work, Dr. C. C. Hisel, state veterinarian, Mr. E. A. Kissick, county farm agent, and Mr. John W. Boehr, extension dairy specialist of the Oklahoma A. & M. College.

The story of this rapid-fire campaign to eradicate bovine tuberculosis from the cattle of Delaware County is a story of remarkable organization by the farm people of the county. Township chairmen were appointed to make the surveys, carry on educational work, arrange for corrals and chutes at the assembly points for the cattle, and take the veterinarians to these points. This work was under way by the middle of December and was managed so competently that everything was in complete readiness for the testing on Monday, January 21. The veterinarians spent the first two days injecting the cattle; on Wednesday, they cleaned up a few scattered herds that had not come in on Monday or Tuesday; on Thursday, they inspected the cattle they had injected on the first day, tagging the cattle that showed a positive



ERADICATING TUBERCULOSIS IN OKLAHOMA

Upper left, these veterinarians are part of the crew of 35 who braved zero weather to test 26,131 cattle in four days on a new "concentration point" plan tried out in Delaware County, Oklahoma. Upper right, it was no comfortable job to get the cattle into concentration points, several miles distant over slippery roads, but it was done. Lower left, Dr. L. J. Allen help check over a herd of 300 Herefords, the largest herd tested. Lower right, this little calf—and two others in the car that cannot be seen—went to be tested in style in the automobile of a high school superintendent.

reaction to the test; on Friday, the procedure was repeated with the remainder of the cattle; on Saturday, odds and ends were cleared away, and the job was done. Of the 26,131 cattle tested, 48 reacted positively. Thus, in four working days was accomplished what would ordinarily have required a month, had the usual method of having veterinarians visit every farm been followed.

Delaware County now becomes one of the more than 30 clean counties in Oklahoma, and the drive was carried to a successful completion without any cost to the county. The herd-owners did all the preliminary work of preparation gratis, thus saving the county, state and federal government the labor of ten veterinarians for 31 days, estimated to amount to \$4,546. Against that is the actual cost of about \$1,800 for all expenses.

The eradication of bovine tuberculosis from Delaware County was more than an achievement. It was, according to the *Daily Oklahoman*, "A modern miracle of medical science stamping out the scourge of tuberculosis. Although the veterinarians worked with cattle, human lives were nevertheless their prize, because bovine tuberculosis is often the infection that kills human beings."

Well done, Drs. Allen, Hisel, Robinson, and your corps of able helpers!

Doctor Chase on the Job

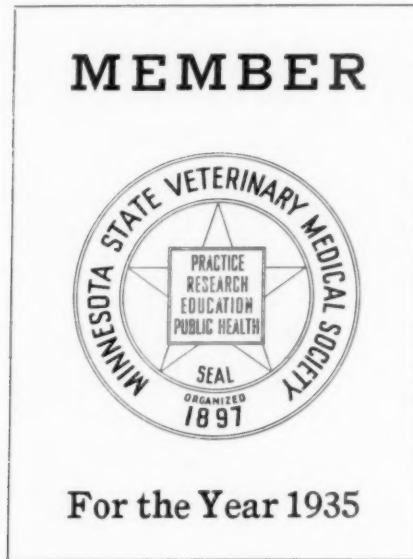
"Five hundred smackers!"

These were not the exact words of Municipal Judge Donald E. Long, of Portland, Ore., but they indicated the size of the fine which F. Peter Utz, operator of a sausage plant in Portland, must pay for storing and offering for sale spoiled meats. The apprehension of Utz was brought about by Dr. E. E. Chase, Chief Meat Inspector for the Portland Bureau of Health, whose activities in rounding up violators who try to sell unwholesome meats have attracted considerable attention.

Judge Long also gave Paul Deppe, manager of the Portland Rendering Company, a suspended fine of \$100 on a charge of selling bad meats to Utz. Charges were preferred by W. C. Elford, head of the Bureau of Health. It was reported that Utz, after purchasing meat from the Portland Rendering Company, marked by that Company as inedible meats, used one barrel during the month of January, 1935, in the manufacture of sausage, and that in February he ordered another barrel. The second barrel was apprehended by Dr. Chase and retained for further investigation.

Samples inspected by the City Laboratory and the U. S. Bureau of Animal Industry showed the meat to be unfit for human food.

Dr. Chase has been a member of the A. V. M. A. Special Committee on Meat Hygiene for several years.



MINNESOTA MEMBERSHIP CARD

Minnesota Displays New Seal

The Minnesota State Veterinary Medical Society has adopted an annual membership card. This shows the new seal of the Society in three colors and also indicates the year for which the member has paid his dues. (See accompanying illustration.) The card measures 5¼x7 inches and is intended to be displayed in the office of the member.

Doctor Schalk Heads Health Board

Dr. Arthur F. Schalk (O. S. U. '08), professor of preventive veterinary medicine, Ohio State University, has been elected president of the Columbus Board of Health, succeeding Dr. Wells Teachnor, whose term expired February 1. Dr. Schalk has been a member of the Board for several years and the value placed on his services by the other members of the Board is reflected in his selection to head that body this year.

Lest someone might get the impression that it is a comparatively new idea for a veterinarian to be a member of a board of health, we are quoting a paragraph from an editorial that appeared in the *American Veterinary Review* in 1881:



DR. A. F. SCHALK

When the first Board of Health in the United States was organized a few years ago, in New York, and a proposition to appoint veterinarians to the Board was made, it was received with ridicule and sarcasm. The recommendation that "horse doctors" should be employed by the State in connection with an organization having for its object the care of public health, was treated as the wildest of absurdities. How changed is all this today; and how different the popular appreciation of the competent and educated veterinarian!

Yes, the date is correctly given—1881.

Phi Zeta Initiations at Iowa State College

The annual initiation ceremony and banquet of Gamma Chapter of Phi Zeta, national veterinary honor society, was held at the Memorial Union of Iowa State College, March 11, 1935. Two honorary members and six active members were received into the Society and were guests of honor at the banquet that followed the initiation.

Those admitted to honorary membership were Dr. Walter L. Bierring, president of the American Medical Association, and Dr. Robert Graham, chief of the Division of Animal Pathology and Hygiene at the University of Illinois. Dr. Bierring is Commissioner of Public Health of Iowa and, in this position, has come in close contact with the veterinary profession where his help and

coöperation have been invaluable. An outstanding figure in American medicine, Dr. Bierring has always been ready to exert his influence on behalf of the veterinarian.

Dr. Graham is an alumnus of Iowa State College, class of 1910. Following his graduation, he spent some time in research at the University of Kentucky and received the degree, Bachelor of Science, from that institution in 1912. During the World War he served as a Captain in the Veterinary Corps. In 1924-1925, he was employed by the Haitian Government to organize an experimental and diagnostic laboratory in that country. Since then he has held his present position at the University of Illinois. His work in animal diseases is well known to all veterinarians.

Three members of the senior class of the Division of Veterinary Medicine were elected to active membership: Carlos T. Rosenbusch, Jacob C. Kaiser and Clarence P. Meredith. The three members of the junior class elected to active membership were: Donald K. Theophilus, Harry M. Halverson and Norman M. Twisselmann.

Dr. H. D. Bergman, president of Gamma Chapter, presided as toastmaster at the banquet. Dr. Bierring gave an address in which he emphasized the close relationship that now exists between the veterinary and medical professions. He stressed the importance of the cultivation of a historical background in all research in human and animal diseases. Dean Friley, of the Division of Industrial Science, was a banquet guest. The theme of his address was the changing trends in education, in which he complimented the veterinary profession for its activities in raising educational standards.

Sales Tax Ruling for Ohio Veterinarians

If an Ohio veterinarian is engaged in the practice of veterinary medicine, his sales of veterinary supplies to his clients are a part of his professional service and therefore are not subject to the state sales tax, is the interpretation given to a recent special ruling made by the Ohio State Tax Commission. The special ruling reads as follows:

A physician or veterinarian for the purpose of amended House Bill No. 134 is the consumer of the various articles which he uses in connection with the rendition of his professional services. In all cases where the physician or veterinarian is actively engaged in dispensing medicinal supplies or selling articles of tangible personal property not directly in connection with his examination or professional service, he is a vendor within the meaning of this Act, must procure a vendor's license and collect the tax on all sales in the manner prescribed by section No. 3 of this Act.

The special ruling was given wide publicity by the newspapers of Ohio.

O. S. U. Broadcasting Program

The broadcasting program of the College of Veterinary Medicine at Ohio State University has completed its sixth month, and will start on the seventh with the broadcast of April 5. The series of weekly talks, given over station WOSU (570 KC) from 7:15 to 7:30 p. m., every Friday by prominent members of the veterinary profession, began on October 5, 1934, and will close on May 31. Programs for the first four months were listed in the JOURNAL for December, 1934.

The following programs were given during February and March:

- February 1—"What Causes a Dog to Scratch?" Dr. J. H. Knapp.
- February 8—"A Dog's Life Is What a Man Makes It," Dr. D. W. Ashcraft.
- February 15—"Do You Know Your Bolognas?" Dr. L. W. Goss.
- February 22—"Keep the Milky Way Clean," Dr. E. C. O'Dell.
- March 1—"Blind Pig' Tactics," Dr. E. D. Martin.
- March 8—"The Runty Pig and Why," Dr. E. D. Martin.
- March 15—"The Best Insurance Against Hog Cholera," Dr. B. H. Edgington.
- March 22—"Spring Care of the Farm Horse," Dr. J. N. Shoemaker.
- March 29—"It Takes Four Sound Legs to Win a Derby," Dr. W. F. Guard.

The following programs will be given during April and May:

- April 5—"Why Rough-Haired, Unthrifty Colts?" Dr. W. R. Krill.
- April 12—"Scabies in Sheep," Dr. A. E. Fogle.
- April 19—"Worms a Sheep Should Not Stomach," Dr. R. E. Rebrassier.
- April 26—"What Is a Clean Range for Poultry?" Dr. P. C. Bennett.
- May 3—"Grub the Old Cow Does Not Need (Warble)," Dr. J. N. Shoemaker.
- May 10—"Animal Disease and Public Health Work," Dr. B. H. Edgington.
- May 17—"State Diagnostic Service," Dr. E. W. Roberts.
- May 24—"Race Horse Doping and Its Detection," Dr. T. C. Fitzgerald.
- May 31—"Dog Days and Days for Dogs," Dr. W. R. Hobbs.

Washington Short Course on Poultry Diseases

The Washington State Veterinary Medical Association and the veterinary staff of the Western Washington Experiment Station of the State College of Washington have joined forces to conduct a two-day veterinary short course on poultry diseases at the Experiment Station at Puyallup, April 19 and 20.

Oklahoma was admitted to the Union, November 16, 1907, as the forty-sixth state.

Antirabic Immunization Endorsed

The following editorial appeared in the *Chicago Tribune* under date of March 13, 1935. As it is one of the best editorials on the subject that has ever come to our attention, it is being reproduced here in full. Veterinarians would do well to preserve it for possible future use, particularly with reference to the endorsement of immunization as a means of protection against this dread disease.

Health officials have called attention to the recrudescence of rabies in this community. In the winter months a year ago only two of the dogs whose brains were examined in the city laboratories were found to be infected. This year the number has increased to twenty-eight. Ninety-six persons who were bitten by rabid dogs in recent months have been ordered to take the Pasteur treatment, and one child, whose case was not reported until a month after he was bitten, has died of the disease.

Fortunately the health and police officials are alive to the situation. Fortunately, too, the methods for preventing the spread of hydrophobia are fully understood.

In all probability the disease has reappeared because the ordinance requiring all dogs to be muzzled when outdoors has not been rigorously enforced for a number of years. Dog-owners should be instructed that no further laxity in this matter will be permitted and they should be encouraged at the same time to have their animals immunized for the protection of the dogs themselves as well as humans. Every effort should be made to remove stray dogs from the streets and alleys.

Warm weather is only a few weeks ahead. More children and more dogs will be playing on the streets, adding greatly to the menace unless the problem is faced frankly and attacked vigorously. This year is the fiftieth anniversary of Pasteur's dramatic demonstration of his preventive of hydrophobia. It would be a sorry commentary upon the intelligence of this community if, fifty years after the disease was conquered, it should cause any more deaths.

In marked contrast to the foregoing editorial is an item which appeared in a recent issue of *Hunting & Fishing Magazine*, under the heading, "The Rabies Racket." It is to be regretted that a publication of this kind should display so much ignorance on a subject which it should know more about. This is the item:

Beware of the attempt of unscrupulous manufacturers and distributors of serum to have laws passed in your town, city or state, compelling inoculation of your dogs with anti-rabies serum. No safe or reliable serum that measures up to the promises has as yet been made.

It has frequently been said that there is more ignorance, superstition and poppycock about rabies than is the case with any other disease. The item above quoted seems to bear out the statement.

Oklahoma is called "the culmination and climax of American pioneering."

ORGANIZATION OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION, 1934-1935

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Term
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H. F. Lienhardt, Kansas State College, Manhattan, Kan. 1936

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T. E. Munce, Department of Agriculture, Harrisburg, Pa. 1939

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AMERICAN VETERINARY MEDICAL ASSOCIATION

Financial Report

JANUARY 1, 1934 TO DECEMBER 31, 1934

Bank balances, January 1, 1934: Checking account.	\$ 2,912.88
Time deposits ...	1,215.00
	<u>\$ 4,127.88</u>
Receipts during period:	
Received from Secretary (dues, JOURNAL, etc.)	\$27,498.41
Interest on bonds and time deposits.....	1,800.99
	<u>29,299.40</u>
Total receipts	\$33,427.28
Expenditures during period:	
A. V. M. A. Fund	\$16,873.94
JOURNAL Fund	17,553.98
	<u>34,427.92</u>
Bank balances, December 31, 1934.....	(\$1,000.64)
Revolving fund in hands of Dr. Hoskins.....	500.00
	<u>(\$ 500.64)</u>
Total cash resources	(\$ 500.64)
U. S. Government Bonds (\$41,000 par value) at cost.....	41,259.02
Due from Salmon Memorial Fund.....	400.00
Deposits in closed East Tennessee National Bank.....	1,333.02
	<u>\$42,491.40</u>
Total assets, December 31, 1934.....	\$42,491.40
Total assets, December 31, 1933.....	47,519.92
	<u>(\$ 5,028.52)</u>
Decrease in assets for the period.....	(\$ 5,028.52)

DISTRIBUTION OF ASSETS

<i>Fund</i>	<i>Cash</i>	<i>Funds in Closed Bank</i>	<i>Bonds (Cost)</i>	<i>Due from Salmon Memorial Fund</i>	<i>Totals</i>
A. V. M. A.....	(\$12,316.62)	\$ 418.00	\$ 5,821.94	\$400.00	(\$ 5,676.68)
JOURNAL	11,815.98	915.02	35,437.08	....	48,168.08
	<u>(\$ 500.64)</u>	<u>\$1,333.02</u>	<u>\$41,259.02</u>	<u>\$400.00</u>	<u>\$42,491.40</u>

Respectfully submitted,

(Signed) M. JACOB, *Treasurer*.

WE HEREBY CERTIFY that we have audited the books of the American Veterinary Medical Association and that the above statement is true and correct to the best of our knowledge and belief.

DAHLBERG & COMPANY.

(Signed) B. I. DAHLBERG.



MAINE VETERINARY MEDICAL ASSOCIATION

The annual meeting of the Maine Veterinary Medical Association was held at the hospital of Dr. M. E. Maddocks, in Augusta, January 8, 1935. The feature of the program was a discussion of the Bang's disease-control program in Maine, which was led by Dr. W. C. Dendinger, Inspector-in-Charge, U. S. B. A. I., Augusta. The election of officers resulted in all the officers who served during the past year being retained: President, Dr. L. E. Maddocks, Lewiston; vice-president, Dr. J. R. Corliss, Augusta; secretary-treasurer, Dr. R. E. Libby, Richmond. Dr. J. F. Witter, of Orono, was reelected as delegate to the A. V. M. A. House of Representatives, with Dr. H. B. Westcott, of Portland, serving again as alternate.

R. E. LIBBY, *Secretary.*

UNIVERSITY OF PENNSYLVANIA VETERINARY CONFERENCE

The thirty-fifth annual Conference of Veterinarians was held at the Veterinary School of the University of Pennsylvania, January 8-9, 1935. The Conference was well attended by men from all channels of veterinary activities. Practitioners, researchers, teachers and sanitary control men came from all parts of the East, the majority from the Middle Atlantic and New England states. As has been the custom for years past, the lecture meetings were conducted in Pearson Hall, while demonstrations and discussions in conjunction with illustrative experiments took place in two of the amphitheater classrooms. The name of Pearson Hall is particularly fitting in connection with this annual gathering, which has already become something of a custom in Pennsylvania, for, 35 years ago the dean of the School, Leonard Pearson, established the first of the series, with the purpose of engendering (in his own words) "the broader public aspect of veterinary science" among practicing veterinarians.

The program arranged by the faculty covered many subjects of timely interest. For the specialists in canine practice, there were Dr. W. J. Lentz, of the faculty, with a paper entitled "The Teeth of the Dog," and Dr. G. W. Little, of New York City, who discussed canine distemper from the practitioner's point of view. In addition to these, Dr. H. M. Martin, also of the faculty, demonstrated a technic for recovering the eggs of internal parasites of the dog and showed motion-pictures portraying cases, experimental and clinical, of salmon poisoning in dogs. Furthermore, the first speaker on the Tuesday afternoon program was Mr. J. L. Passmore, of the Pennsylvania State Bureau of Animal Industry, who gave an extremely interesting talk on the activities of the State's Division of Dog Law Enforcement. As something of a digression from the strong "canine" tendency of this first meeting, Dr. Martin also showed a group of pictures revealing the life history of the bovine and ovine liver flukes.

The Tuesday evening session began with a display of moving pictures of African game, prepared and conducted by Mr. Frank B. Foster, of Haverford, Pa., who had taken the pictures. After Mr. Foster's entertaining contribution, Dr. D. H. Wenrich, of the Zoölogy Department, gave a penetrating analysis of the factors concerned in the host-parasite relations between domestic animals and their protozoan parasites.

Horse practice came into its own at the Wednesday morning session. Dr. W. J. Lee, of the Veterinary School staff, led off with motion-pictures depicting various types of lameness. This was succeeded by a survey of the literature on periodic ophthalmia, by Dr. H. L. Ratcliffe, of the Medical School, from a review he had made in reference to a proposed investigation of the disease. Dr. J. A. Rogers, of Bryn Mawr, Pa., presented case reports from cattle practice, analyzed in his own familiar, cryptic style. Dr. Robert S. MacKellar, president of the American Veterinary Medical Association, was the last speaker at this session. The main burden of Dr. MacKellar's discourse was an appeal to "sell" the veterinary profession to the public.

In the afternoon, the dominant theme was bovine practice. Dr. M. A. Emmerson, of the veterinary faculty, opened the meeting with demonstrations of embryotomy technic on bovine fetuses. He was followed by Dr. W. W. Dimock, of the University of Kentucky, who discussed horse-breeding problems in a comprehensive résumé of his own studies in that field. After Dr. Dimock, Dr. L. A. Klein, of the veterinary faculty, delivered a report on some of his studies on the effects of mastitis streptococci on the udder and milk of the cow. The last speaker on

the program was Dr. R. S. Amadon, also of the veterinary faculty, who demonstrated before the group, on a cow with a rumen fistula, his method of recording the action of ruminatorics. He had had a unit of recording apparatus, with cow stocks, pressure recorders and kymograph drums, assembled in the amphitheater, so that while he was lecturing on the practical features of drug actions, the actual effect could be seen recorded on the kymograph drum.

From the large attendance and earnest enthusiasm manifest throughout the Conference, this one was generally conceded to have been one of the most profitable of the series. The faculty of the School of Veterinary Medicine is to be congratulated on the splendid program arranged in the face of curtailments in appropriations. Notwithstanding serious obstacles, the faculty planned a splendid meeting and carried it through in the best traditions of the Veterinary School.

A. H. CRAIGE, *Reporter.*

OKLAHOMA VETERINARY MEDICAL ASSOCIATION

The twentieth annual meeting of the Oklahoma Veterinary Medical Association was held at the Skirvin Hotel, Oklahoma City, January 14-15, 1935. Augmented by a number of out-of-state veterinarians, almost equal to the state's normal veterinary population, who are temporarily employed by the U. S. Bureau of Animal Industry in tuberculosis eradication, Bang's disease control and other governmental activities, the attendance reached a new high record. The total registered attendance for the two days reached 200, of which 135 were veterinarians, while the remainder was made up of the wives of veterinarians and a sprinkling of laymen who were interested in some phase of the program.

Dr. J. T. Wilson, of Pawnee, president of the Association, opened the meeting and presided at the morning session of the first day. This session was devoted entirely to receiving reports of officers and committees, the admission of new members and other regular Association business. Twenty-seven new members were admitted to the Association. Dr. E. W. Meads, of Claremore, presided at the afternoon session, at which the following literary program was presented:

"Bang's Abortion Disease—Economic and Public Health Significance," by Dr. C. P. Fitch, of the University of Minnesota.

"Undulant Fever—A Joint Problem for the Physician and the Veterinarian," by Dr. Walker Morledge, of Oklahoma City.

"Bovine Mastitis," by Dr. C. E. Salsbery, of Kansas City, Mo.
"Mineral Metabolism," by Dr. H. W. Orr, of Stillwater.

The annual banquet was held in the Empire Room of the Skirvin Hotel, with Dr. O. E. Robinson, of Bixby, presiding. The 184 persons present are believed to represent the largest attendance ever recorded at any Association banquet in Oklahoma. After-dinner speaking, dancing and other appropriate entertainment marked the festivities of the evening.

Dr. F. Y. S. Moore, of McAlester, presided at the morning session of the second day. The following program was presented:

"The Control of Bang's Disease, with Especial Reference to the Federal Project of Cattle Reduction on the Basis of Bang's Disease Control," by Dr. C. P. Fitch.

"Canine Distemper," by Dr. T. W. Munce, of Sioux City, Iowa.

"American Veterinary Medical Association," by Dr. H. Preston Hoskins, secretary-editor of the A. V. M. A., Chicago, Ill.

Round-table discussion, led by Dr. A. T. Kinsley, of Kansas City, Mo.

"The Internal Parasites of the Horse," by Dr. L. O. Mott, of Spencer, Neb.

The afternoon session was devoted largely to the organization of committees in preparation for the forthcoming A. V. M. A. meeting at Oklahoma City.

The Ladies' Auxiliary, more active than at any previous meeting, held an interesting business meeting at which officers were elected and other business transacted. The entertainment provided for them consisted of a theater party, a luncheon and other selected features.

It was especially gratifying to note the optimism and general good feeling that were manifest throughout the meeting. The dominant note appeared to be that the worst was almost over and that a brighter future lay ahead for the entire profession. This was reflected in the enthusiastic interest shown in the 1935 A. V. M. A. Convention which the members of the Oklahoma Association will entertain in August. The splendid spirit of coöperation which was displayed leaves no room to doubt that every member of the Association fully understands his responsibility and is eager to contribute to the success of the meeting. By a vote of the Association, it was decided to omit the semi-annual meeting, which is always held in midsummer, this year, and, instead, call a short meeting some time during the A. V. M. A. meeting.

Officers elected for the coming year are: President, Dr. E. W. Meads, Claremore; vice-president, Dr. W. L. Hiatt, Edmond;

treasurer, Dr. F. Y. S. Moore, McAlester (reelected); secretary, Dr. C. H. Fauks, Oklahoma City (reelected).

C. H. FAUKS, *Secretary*.

OHIO STATE VETERINARY MEDICAL ASSOCIATION

The fifty-second annual meeting of the Ohio State Veterinary Medical Association was held at Columbus, January 16-17, 1935. Approximately 200 veterinarians attended, including visitors from Indiana, Michigan and Pennsylvania.

The meeting was called to order by the President, Dr. E. V. Hover, of Lima, who made the opening address. The literary program consisted of the following papers:

"Equine Breeding Problems," by Dr. W. W. Dimock, of the University of Kentucky.

"Equine Obstetrics," by Dr. J. E. Morris, of Lima.

"Common Ailments in Horse Practice," by Dr. R. S. MacKellar, president of the A. V. M. A.

"Diseases of Swine," by Dr. Donald Baker, of Wabash, Ind.

"Sore Mouth in Cattle," by Dr. E. D. Martin, of the Ohio Department of Agriculture.

"Horse Parasite Control," by Dr. Benjamin Schwartz, of the Zoölogical Division, U. S. B. A. I., Washington, D. C.

"Canine Dystocia and Its Treatment, with Special Reference to Hysterotomy Under Local Anesthesia," by Dr. J. A. Campbell, of Toronto, Canada.

"Present Status of Controlling Pullorum Disease in Hatcheries and Some Factors the Veterinarian Must Consider," by Dr. J. T. Burriss, of the Ohio Department of Agriculture.

"Bang's Disease Eradication Programs," discussed from the federal, state and laboratory viewpoints, by Dr. A. J. DeFosset, of the U. S. B. A. I., Columbus, and Drs. H. G. Bond and E. W. Roberts, of the Ohio State Department of Agriculture.

A banquet brought the first-day program to a close. Dr. Hover presided as toastmaster. The guests were introduced, and a very fine program of musical entertainment was enjoyed by all present. A special program of entertainment for the ladies was given during their visit in Columbus, and approximately 75 ladies were present at these events.

Officers were elected for the coming year as follows: President, Dr. J. W. Jackman, Columbus; vice-president, Dr. H. E. Myers, Cleveland; secretary, Dr. R. E. Rebrassier, Columbus; treasurer, Dr. D. C. Hyde, Columbus; member of the Executive Committee, Dr. B. H. Edgington, Bexley; delegate to the A. V. M. A. House of Representatives, Dr. W. F. Guard, Columbus; alternate, Dr. E. A. Downs, Mount Sterling.

R. E. REBRASSIER, *Secretary*.

COLORADO VETERINARY MEDICAL ASSOCIATION

The thirty-first annual meeting of the Colorado Veterinary Medical Association was held at the Albany Hotel, Denver, January 17, 1935. This date fell during the week of the annual Western National Live Stock and Horse Show, held in Denver, thus enabling the veterinarians to attend both their meeting and the show. A good attendance was registered.

The following literary program was presented:

"Report on the Twelfth International Veterinary Congress held in New York, August, 1934," by Dr. I. E. Newsom, of the Colorado Agricultural College.

"Report of the Meeting of the A. V. M. A. House of Representatives held during the Twelfth International Veterinary Congress," by Dr. E. N. Stout, of the Colorado Agricultural College.

"The Control of Bang's Disease Among Range Cattle," by Dr. Floyd Cross, of the Colorado State Experiment Station.

"The Poisonous Plants of Colorado," by Dr. L. W. Durrell, of the Colorado Agricultural College.

"The Use of X-Ray in Veterinary Practice—Lecture and Demonstration," by Mr. Roy Woods, of the General Electric Company.

"Problems Relative to the Fox Industry," by Mr. Dave E. Gibbs, Monument, Colo.

"Tuberculosis and Bang's Disease Eradication in Colorado," by Dr. J. O. Wilson, of the U. S. B. A. I., Denver.

Two new members of the Association were elected: Dr. A. H. Groth and Dr. N. F. Christensen, both of the Colorado Agricultural College.

Officers were named for the coming year as follows: President, Dr. E. N. Stout, Fort Collins; first vice-president, Dr. C. J. Hayden, Arvada; second vice-president, Dr. T. H. Brady, La-Junta; secretary-treasurer, Dr. B. R. McCrory, Fort Collins. Elected to membership on the Board were Dr. H. E. Kingman, of Fort Collins, and Dr. A. N. Carroll, of Pueblo.

B. R. MCCRORY, *Secretary.*

STATE VETERINARY MEDICAL ASSOCIATION OF TEXAS

The twenty-fifth annual meeting of the State Veterinary Medical Association of Texas was held at Kingsville, January 21-22, 1935, with approximately 50 veterinarians in attendance.

The opening session was called to order by the President, Dr. R. L. Rhea, of San Antonio, in the auditorium of the Texas College of Arts and Industries. President J. O. Loftin, of the College, gave the invocation. The address of welcome was made by Mr. E. B. Erard, secretary of the Chamber of Commerce, with Dr. L. G. Cloud, of Laredo, responding for the visiting delegates.

Both the morning and afternoon sessions of the first day were devoted to discussions of professional problems. Dr. A. T. Kinsley, of Kansas City, Mo., spoke on the subject of "Bang's Disease and Its Control," which was discussed by Dr. L. G. Cloud, of Laredo, and Dr. M. E. Gleason, of San Antonio. Dr. I. B. Boughton, of Sonora, presented a valuable paper on "External and Internal Parasites of Domestic Animals." Lieut. G. T. Price, V. C. U. S. A., of Fort Sam Houston, gave an interesting presentation on "The Use of the X-Ray in Large- and Small-Animal Practice." Dr. A. A. Lenert, of College Station, spoke ably on "The Treatment of Dirofilariasis," which was discussed in all its phases by Drs. U. E. Marney, of San Antonio, L. E. Casey, of Dallas, and S. R. Dunn, of Corpus Christi.

In the evening, the veterinarians and their ladies were guests of the officers and directors of the Kingsville Chamber of Commerce at an all-Kleberg County products dinner, prepared by the ladies of the Methodist Church. Dr. A. T. Kinsley occupied the chair of honor as toastmaster, and presented the following after-dinner speakers: President Al Kleberg, of the Chamber of Commerce; Mayor J. C. Nolan, of Kingsville; President J. O. Loftin, of the Texas College of Arts and Industries; and Drs. L. G. Cloud, of Laredo; H. L. Darby, of Fort Worth; M. E. Maier, of Orange, and T. O. Scott, of Waco.

The second day was devoted to clinics. In the morning, Dr. J. K. Northway, of Kingsville, conducted a large-animal clinic at the King Ranch, assisted by Drs. W. R. Sanderson, of Brownwood, and Dr. E. C. Smotherman, of Hillsboro. In the afternoon, a small-animal clinic was held under the supervision of Dr. A. A. Lenert, of College Station.

Officers elected to serve during the coming year are: President, Dr. J. K. Northway, Kingsville; first vice-president, Dr. Charles W. Neal, San Antonio; second vice-president, Dr. L. I. Lucey, Fort Worth; secretary-treasurer, Dr. D. Pearce, Leonard (reelected).

D. PEARCE, *Secretary*.

NEVADA STATE VETERINARY ASSOCIATION

The annual meeting of the Nevada State Veterinary Association was held at Reno, January 30, 1935. Dr. C. J. Parshall, of the University of California, as the guest of honor and principal speaker, gave an interesting and instructive discussion of bovine mastitis. He spoke also on the supervision of certified dairies in the San Francisco Bay area. A symposium on Bang's disease

was led by Dr. R. A. Given, of Reno, B. A. I. Inspector-in-Charge, and Dr. L. R. Vawter, of the University of Nevada, reported an investigation of a recent case of infectious bulbar paralysis (pseudorabies or mad itch) in which he was successful in recovering the virus.

The Association dinner was held at the Hotel El Cortez. Dr. Edward Records, of the University of Nevada, was asked to speak in his capacity as the newly elected president of the U. S. Live Stock Sanitary Association, and responded with a few well chosen remarks concerning the purposes of that organization, giving, in addition, the highlights of the meeting in Chicago in December. Mr. Ernest Brooks, instructor in dairy husbandry at the University of Nevada, and a leader in the dairy industry, was also an after-dinner speaker. His remarks were greatly enjoyed.

Newly elected officers of the Association are: President, Dr. Harry U. Williams, Yerington; vice-president, Dr. R. A. Given, Reno; secretary-treasurer, Warren B. Earl, Reno (reëlected).

WARREN B. EARL, *Secretary*.

CONNECTICUT VETERINARY MEDICAL ASSOCIATION

The annual meeting of the Connecticut Veterinary Medical Association was held at Hartford, February 6, 1935. The following slate of officers was elected to serve during the coming year: President, Dr. E. M. Bitgood, Middletown; first vice-president, Dr. F. J. Brockett, Suffield; second vice-president, Dr. E. R. Dimock, Merrow; secretary-treasurer, Dr. Edwin Laitinen, West Hartford. The following members were chosen on the Board of Censors: Dr. A. T. Gilyard, of Waterbury, Chairman; Dr. G. E. Corwin, of Hartford; Dr. G. W. Loveland, of Torrington; Dr. I. R. Vail, of Bristol, and Dr. G. T. Crowley, of New Britain. Dr. Laitinen was named as delegate to the A. V. M. A. House of Representatives and Dr. Gilyard was chosen as alternate.

EDWIN LAITINEN, *Secretary*.

VETERINARY ASSOCIATION OF MANITOBA

The forty-eighth annual meeting of the Veterinary Association of Manitoba was held at the Saint Regis Hotel, Winnipeg, February 8, 1935, with members from all parts of the province in attendance.

An interesting program was presented. A splendid address was given by Hon. D. G. McKenzie, Minister of Agriculture. Dr. H. R. McEwen spoke on "Assistants in Practice," and Prof. J. M. Brown presented an informative paper on "Mineral Requirements of Animal Nutrition." Of special interest also were a paper by Dr. J. R. Fisher, on "Promoting and Discouraging Veterinary Practice," and a presentation by Dr. H. J. Tingley, on "Hints in Small-Animal Practice."

Officers elected to serve during the coming year are: President, Dr. A. L. Alton, Portage la Prairie; vice-president, Dr. H. R. McEwen, Stonewall; secretary-treasurer, Dr. William Hilton, Winnipeg. These officers were also named as the Board of Examiners. Dr. A. M. MacFarlane and Dr. H. J. Tingley, of Winnipeg, were appointed auditors. Members of the Council were chosen as follows: Dr. R. H. Lay, of Winnipeg; Drs. A. L. Alton, H. R. McEwen and William Hilton; Dr. J. R. Fisher, of Brandon; Dr. J. A. Martin, of Sperling, and Dr. Alfred Savage, of the University of Manitoba. Dr. W. A. Hilliard, of Vancouver, B. C., and Dr. J. F. Fisher, of Brandon, were elected to honorary membership in the Association.

WILLIAM HILTON, *Secretary.*

NORTH CAROLINA STATE VETERINARY MEDICAL ASSOCIATION

A special winter meeting of the North Carolina Veterinary Medical Association was held at Raleigh, February 13, 1935, with 55 members and visitors in attendance. The President, Dr. P. M. Abernethy, of Burlington, presided.

The literary program was interesting. Dr. S. O. Fladness, of the Field Division, U. S. B. A. I., Washington, D. C., gave an address on "Cattle Scab." Cattle scab has attained considerable importance in North Carolina since the arrival of more than 100,000 cattle from the drouth areas last summer and fall. Already several centers of infection have been found in the native cattle which came into contact with the relief cattle. Dr. Fladness recommended lime-sulfur solution and nicotine sulfate solution to control the disease.

Dr. A. A. Husman, Inspector-in-Charge, U. S. B. A. I., Raleigh, discussed the Bang's disease program in North Carolina. He said that work is being carried on in 786 herds, consisting of 20,000 cattle, and that approximately 2,000 reactors have been detected. Only a few of the accredited practitioners of the state

have been assigned to this work. Dr. Wm. Moore, State Veterinarian, read a paper on "Professional Ethics." Dr. H. Calvin Rea, of Charlotte, discussed "The Relationship of Animal Diseases to Human Health." Dr. W. T. Scarborough, of Raleigh, read a paper on "Rabies," and discussed a compulsory vaccination bill now pending in the North Carolina General Assembly. Dr. W. A. Hornaday, of Greensboro, spoke on "My Experience in Sterility Work."

Dr. A. A. Husman reported the meeting of the A. V. M. A. House of Representatives in New York last August. He was elected a delegate to the House of Representatives, to serve for a two-year term beginning March 1, 1935. Dr. Wm. Moore was named as alternate. The meeting was brought to a successful close with a banquet at the Carolina Hotel.

J. H. BROWN, *Secretary*.

ILLINOIS STATE VETERINARY MEDICAL ASSOCIATION

The fifty-third annual meeting of the Illinois State Veterinary Medical Association was held in Springfield, February 19-20, 1935, with a splendid attendance. An outstanding feature of the meeting was the receipt of 60 applications for membership.

The program opened with the address of the President, Dr. J. A. Owens, of El Paso, followed by the reports of the various committees. Dr. H. C. Rinehart, Chief Veterinarian, Springfield, gave an interesting discussion of "Rabies." Dr. J. J. Lintner, of the U. S. B. A. I., Chicago, then spoke on "The Federal-State Bang's Disease-Control Program in Illinois." He was followed by Dr. A. C. Bolle, of Arenzville, whose subject was "Official Pullorum Disease Testing in Illinois." The afternoon session was devoted almost entirely to business, with the exception of two papers: "Diseases of Feeder Cattle," by Dr. H. C. Wadleigh, of Seaton, and "The Development of Canine Practice in Rural Communities," by Dr. Otto Stader, of Geneva.

Dr. L. A. Merillat, of Chicago, acted as toastmaster at the banquet session. Dr. Frank J. Jirka, Director, Department of Public Health, State of Illinois, spoke on diseases communicable from animals to man. He stressed the importance of and necessity for all medical societies opposing vigorously the activities of the anti-vivisectionist organizations which have for their goal the elimination of all animal experimentation and the strangulation of medical progress.* He was followed by Dr.

*The address of Dr. Jirka is published in full in this issue of the JOURNAL.

J. D. W. A. Coles, of Pretoria, South Africa, who delivered an instructive address on "Veterinary Science in Its Relation to Society in British South Africa." The closing feature was an address by Mr. Wayne Dinsmore, secretary of the Horse and Mule Association of America, on the horse situation in America.

First to appear on the second-day program was Dr. Frank Hare, of Lexington, Ky., who spoke on "Horse Practice." Dr. Clem Pierce, of Hubbard, Iowa, presented a splendid paper on "Swine Diseases," and Dr. Coles delivered an interesting lantern-slide lecture on "Aegyptianellosis of Poultry." The afternoon session was opened by Mr. Ellis McFarland, of the Serum Code Authority, Chicago, who explained several features of the Code. Dr. Ashe Lockhart, of Kansas City, gave a practical discussion of the use of blood in veterinary practice. This was followed by a well received paper on "Canine Distemper," by Dr. S. H. Regenos, of Zionsville, Ind. The meeting ended with a general discussion of "So-Called Corn Stalk Disease," by Dr. Robert Graham, of Urbana, and Dr. L. T. Giltner, of the Pathological Division, U. S. B. A. I., Washington, D. C.

Officers who will serve during the coming year are: President, Dr. H. W. Leib, Winchester; vice-president, Dr. J. R. Brown, Jr., Ottawa; secretary-treasurer, Dr. C. C. Hastings, Williams-ville; member of the Executive Board, Dr. T. J. Foster, Monticello.

C. C. HASTINGS, *Secretary.*

VETERINARY MEDICAL ASSOCIATION OF NEW YORK CITY

The February meeting of the Veterinary Medical Association of New York City was held at the Hotel New Yorker on the 7th.

Dr. Cassius Way, the speaker of the evening, addressed the members on the subject, "Chronic Equine Arthritis." Dr. Way has spent a great deal of time during the past six years delving into the records on arthritis in both humans and animals. Comments on the paper are omitted, as it is to be published in the JOURNAL of the A. V. M. A.*

MARCH MEETING

The March meeting was held at the Hotel New Yorker on the evening of the 6th, with 150 members in attendance to welcome the speakers of the evening, Dr. John R. Mohler, Chief of the

*The paper is published in full in this issue of the JOURNAL.

U. S. Bureau of Animal Industry, Washington, D. C., and Dr. Victor Carabba, of the Department of Surgery, New York University.

Dr. Mohler gave a résumé of the work still to be done in compiling the records of the Twelfth International Veterinary Congress and in getting the printing of the proceedings under way in order to have volume one in the hands of the members within the next few months. He warmly congratulated the members of the local committees for their work in making the Congress a success and also the numerous individuals who made such generous donations. Dr. Mohler then discussed the topics of tuberculosis, Bang's disease, mastitis, trichinosis and heart worms in dogs. Veterinarians were urged to seek the services of the Bureau in helping to solve some of their knotty problems. Dr. Mohler pointed out that the various departments of the Bureau are willing to join with the practitioner in the distribution of helpful information. At the end of his splendid lecture, Dr. Mohler was given a hearty vote of thanks.

Dr. Carabba, who is a fellow of the American College of Surgeons and a pioneer in the advance of modern surgery, presented an illustrated lecture on the topic, "Electro-Surgical Aseptic Intestinal Anastomosis." Lantern-slides were shown, depicting the anastomosing of large intestine to small intestine, stomach to large intestine, and various other combinations. The intestine is not cut with an operating-knife but, using the Oudine current, the radio knife is applied to the surfaces of the bowel. Then the serosa is sutured to serosa, and the area to which the radio knife has been applied breaks down and a new aperture is formed. The entire process takes place in about 72 hours. There is no spillage of the intestinal content, and the normal function of the bowel is resumed through the new opening. Dr. Carabba has performed this operation on more than 50 cases, all of which were successful. Anastomosis operations, which heretofore have been considered impracticable, are now performed successfully and conditions that have been considered hopeless are relieved. Dr. Carabba told of a case of a patient who is living and doing nicely with but a small part of his intestine. At a later date, members of the Association hope to hear Dr. Carabba again and to observe a demonstration of his technic in performing this operation.

R. S. MACKELLAR, JR., *Secretary.*

Doing easily what others find difficult is talent; doing what is impossible for talent is genius.—AMIEL.

NECROLOGY



COLONEL GERALD E. GRIFFIN

Colonel Gerald E. Griffin, U. S. A., retired, died at Walter Reed General Hospital, Washington, D. C., February 2, 1935.

Born in Birmingham, England, March 18, 1860, Colonel Griffin came to the United States in the early eighties. After spending approximately a year on a cattle ranch in the West, he journeyed to Washington, D. C., where he enlisted as a private in Company C, Signal Corps, U. S. Army. While stationed in Washington, he studied medicine for a year or more and was then transferred to Fort Robinson, Neb., where he was honorably discharged, June 28, 1888, as a First Class Private. He then went to New York, N. Y., where he enrolled as a student in the American Veterinary College under Dr. Alexander Liautard and was graduated in 1889.

In September, 1889, Colonel Griffin was appointed Veterinary Surgeon, 5th U. S. Cavalry, with the rank of Regimental Sergeant Major, by warrant issued by the Secretary of War, to succeed Dr. Benjamin D. Pierce, of Massachusetts, who resigned in July, 1889. The 5th Cavalry was stationed at Fort Reno, Indian Territory, at that time, and Colonel Griffin served with this regiment in Indian Territory and Texas until 1899. In 1899, Congress authorized two veterinarians, one first class and one second class, for each Cavalry regiment. Colonel Griffin was appointed veterinarian, first class, 5th U. S. Cavalry, with pay and allowances of a second lieutenant mounted. He was appointed Chief Veterinarian, Puerto Rico Expeditionary Forces, in November, 1899, and served at San Juan and Mayaguez, P. R., until this force returned to the United States in 1901, when he was assigned to Fort Sheridan, Ill. Transferring to the Artillery Corps as veterinarian on June 21, 1901, he continued to serve until the organization of the Veterinary Corps in June, 1916. During this period, Colonel Griffin served as Chief Veterinarian, Army of Cuban Pacification, 1906-1908. He succeeded the late Dr. Sidney L. Hunter, veterinarian, 6th Cavalry, as instructor

in hippology, School of the Line, Fort Leavenworth, Kan., in June, 1909, and served there until October, 1913.

When the Veterinary Corps was organized as a result of the passage of the National Defense Act, June 3, 1916, Colonel Griffin and the late Dr. Olaf Schwarzkoph were selected as the first veterinary examining board to examine all veterinarians, then on duty in the Army, for commissions, and to initiate the first organization plans for the present Army Veterinary Corps. He was commissioned a major, due to his length of service, and was appointed the first Chief of the Veterinary Division, Surgeon General's Office, when this country entered the World War, and continued in this capacity until November, 1917. He was appointed Veterinary General Inspector for the eastern zone, in which capacity he served to coördinate the field activities until he was called upon to organize the Veterinary Training Center at Camp Lee, Va., in April, 1918. His last assignment and station was at Governors Island, N. Y., where he was retired from active service on July 7, 1922, on account of physical disability incident to such service.

Colonel Griffin always was an outstanding leader in the military veterinary profession. He found time to take two post-graduate courses during his career, and, without a doubt, Colonel Griffin, by his high personal ideals and professional qualifications, was one of the early pioneers who had a great deal to do with establishing the present Army Veterinary Corps.

Colonel Griffin was a member of the A. V. M. A. from 1890 until 1899. During this time, he served as Resident Secretary for the Indian Territory (1891-92), Oklahoma Territory (1892-93) and Texas (1893-94 and 1896-97). He was a member of the Committee on Army Legislation (1893-94). Interment, with simple services at the grave in Arlington National Cemetery, was held on February 5. He is survived by his widow and daughter, who reside in Washington, D. C.

R. J. F.

E. C. HIGDON

Dr. E. C. Higdon, of Vanada, Miss., died at his home, October 15, 1933. He was 47 years old. A graduate of the Terre Haute Veterinary College, class of 1917, Dr. Higdon practiced at Madisonville, Ky., until he removed to Vanada four years ago. He is survived by his widow, three daughters, his father, three sisters and three brothers. Burial was made in the Odd Fellows Cemetery at Madisonville, Ky.

A. A. IMMELL

Dr. A. A. Immell, of Kansas City, Mo., died March 15, 1934. Born in 1859, Dr. Immell was a graduate of the Kansas City Veterinary College, class of 1896. After practicing veterinary medicine for a time, he decided to become a physician and entered the Eclectic Medical University at Kansas City. He received his M. D. degree in 1913 and embarked upon the practice of medicine in Kansas City, in which he was active until his death.

H. EVERETT STEARNS

Dr. H. Everett Stearns, of Jefferson City, Mo., died November 25, 1934, following a heart attack. He was 58 years old.

Dr. Stearns was a native of New Jersey and a graduate of the New York-American Veterinary College, class of 1908. He served with the Veterinary Corps during the World War. He was commissioned a second lieutenant on September 28, 1917, and assigned to duty at the Remount Depot, Front Royal, Va. On February 27, 1918, he embarked for active duty overseas, and was made a first lieutenant on April 19, 1918. He received his discharge papers, July 10, 1919, and returned to his home in New Jersey, but soon moved to Kasson, Minn., where he engaged in private practice. After a few years of practice, he received an appointment in the U. S. Bureau of Animal Industry and served on the field forces in Minnesota, New York, Pennsylvania, Virginia and Missouri.

Dr. Stearns was a member of the National Association of B. A. I. Veterinarians and of the American Legion. Surviving are his widow, one daughter and two sons.

RICHARD C. CHRISTENSON

Dr. Richard B. Christenson died at the home of his sister in Sabetha, Kan., December 23, 1934. Death was caused by tuberculosis.

Born at Sabetha, Kan., March 7, 1891, Dr. Christenson received two years of high school training before entering the Kansas City Veterinary College. Following his graduation in 1917, Dr. Christenson became associated with the Kansas Live Stock Commission as field veterinarian, a position he held throughout his entire active professional life.

Dr. Christenson joined the A. V. M. A. in 1917. He leaves a widow, one sister and one brother.

ABELARDO FERNANDEZ Y MALBERTY

Lt. A. Fernandez y Malberty, according to a report received from Dr. Bernardo J. Crespo, was killed during the latter part of 1934 during the fight between the ex-officers and soldiers of the Cuban army, at the National Hotel, Havana. Born at Calabazar, Cuba, December 20, 1892, Lt. Fernandez was graduated from the Veterinary Department of the University of Havana in 1914. He joined the A. V. M. A. in 1931.

J. J. MOORE

Dr. J. J. Moore, of Lamoni, Iowa, died December 19, 1934. He was stricken with apoplexy while on a professional call. He was a graduate of the Ontario Veterinary College, class of 1895, and practiced for a time at Corning, Iowa. He was a member of the Iowa Veterinary Medical Association.

ARCHIBALD BLAND MUIR

Dr. Archibald B. Muir, of Grand Rapids, Mich., died December 30, 1934. He was born in Rothesay, Scotland, April 2, 1876, and came to this country as a boy. He lived in Ohio for a time and then removed to Jackson, Mich., with his uncle, Robertson Muir, who was graduated from the Royal College of Veterinary Surgeons (Glasgow) in 1875. He studied veterinary medicine with his uncle, and later the two located in Grand Rapids, where they practiced together until 1912. Dr. Robertson Muir was a member of the faculty of the Grand Rapids Veterinary College, 1910-1912. Dr. A. B. Muir became interested in humane work and conducted a clinic for the Kent County Humane Society at his office on Saturday afternoons. Dr. and Mrs. Muir, who assisted him in the clinic, were both made honorary life members of the Society last fall.

ERNEST J. BANNISTER

Dr. E. J. Bannister, of Inwood, Ont., died January 7, 1935, following an illness of several weeks. He was 52 years of age. Dr. Bannister was a graduate of the Ontario Veterinary College, class of 1914, and had practiced in Forest, Ont., before going to Inwood. Surviving are his widow, a daughter, a son, two brothers and a sister.

EARL COLUMBUS MARTINDALE

Dr. Earl C. Martindale, of Coleman, Mich., was shot and killed, January 18, 1935, following an attempt to corner a burglar in a business building in Coleman. Dr. Martindale had volunteered his services as a deputy sheriff in an effort to stop a series of robberies in the town. The killer was caught within 24 hours and placed in the Michigan State Penitentiary to serve a life sentence.

Dr. Martindale was a graduate of the Ontario Veterinary College, class of 1916. He served in the Army during the World War. On March 28, 1918, he was commissioned a second lieutenant and directed to report to Camp Greenleaf, Ga., for a course of instruction. On June 25, 1918, he was assigned to duty with the 310th Cavalry, Fort Ethan Allen, Vt. He served also with the 58th Field Artillery at Camp Jackson, S. C., and Fort Ethan Allen. He was promoted to a first lieutenantcy, July 19, 1918. He was ordered to Camp Lee, Va., for duty, February 27, 1919, and received his discharge papers, August 2, 1919. Dr. Martindale was commissioned a first lieutenant in the Organized Reserve, June 8, 1921.

THOMAS C. ROBINSON

Dr. Thomas C. Robinson, of White Hall, Md., died February 3, 1935, following an operation. Born at White Hall, November 5, 1890, Dr. Robinson was a graduate of McKillip Veterinary College, class of 1918, and had been in general practice at White Hall since that year. He was an able practitioner and well liked in the territory he served. Dr. Robinson joined the A. V. M. A. in 1919.

STANLEY WILLIAM BROWN

Dr. S. W. Brown, of Hamilton, Ohio, died February 5, 1935. He had complained of feeling ill for several days before the heart attack that ended his life.

Born at Okeana, Ohio, July 9, 1882, Dr. Brown received his early education in the public schools of Okeana, following which he taught for two years in the public schools of Butler County. He then entered Ohio State University for the study of veterinary medicine and was graduated with the class of 1907. The following year, he located at Hamilton where he practiced continuously until his death. Dr. Brown spent his entire life in

Butler County, where his skill in his profession and his pleasant, likable personality endeared him to all with whom he came in contact.

Dr. Brown joined the A. V. M. A. in 1920. He was a member of the Ohio State Veterinary Medical Association, and a charter member of Alpha Chapter of Alpha Psi Fraternity. Surviving are his widow (née Mary Alice Horton), one son, three brothers and three sisters.

H. CLIFFORD MURRAY

Dr. H. Clifford Murray, of Glens Falls, N. Y., died February 6, 1935, following an illness of a year. He was 60 years old.

Born at Luzerne, N. Y., Dr. Murray was a graduate of the Ontario Veterinary College, class of 1902, and of the New York-American Veterinary College, class of 1905. He had practiced in Saratoga, Washington and Warren Counties for more than a quarter of a century and, at the time of his death, was operating one of the largest small-animal hospitals in the state.

Dr. Murray joined the A. V. M. A. in 1919. He was also a member of the Hudson Valley Veterinary Medical Society. For many years he served as chairman of the Warren County Tuberculosis Committee, as well as County Veterinarian. He was a member of the Masonic Order. Surviving Dr. Murray are his widow and one son, Dr. Clifford P. Murray (Corn. '34).

G. S. M.

W. F. BROWNLEE

Dr. W. F. Brownlee, of Kirkwood, Ill., died at his home, February 8, 1935. Although he had been in failing health for several months, due to diabetes, his death was sudden and unexpected.

Born at Chariton, Iowa, March 7, 1871, Dr. Brownlee passed his boyhood days on an Iowa farm, and from there entered the Chicago Veterinary College. Following his graduation, in 1894, he practiced in Iowa and at various points in the southern states, finally locating at Little York, Ill., where he practiced for 19 years. In 1914, he removed to Kirkwood, where he continued in practice and where he was active in civic and professional circles until his death. He was prominent in veterinary activities in Illinois, and was a staunch Republican and a strong party man.

Dr. Brownlee joined the A. V. M. A. in 1909. He was also a member of the Mississippi Valley Veterinary Medical Association and served as president for a number of terms. Surviving are

his widow (née Ella Mae Simons) and one brother. Burial was made at Hometown, Ind.

OTIS H. MOHNEY

Dr. Otis H. Mohny, of Goodland, Ind., died February 7, 1935, at the home of his sister in Otsego, Mich., where he had been taken about a week before his death. He had been a sufferer from heart trouble for some time. He was 69 years old.

Following his graduation from the Ontario Veterinary College in 1890, Dr. Mohny practiced a short time at Vicksburg, Mich. He then moved to Goodland, where he practiced for almost 40 years. He was a member of the Town Board and was very active in church circles. He was a member of the A. V. M. A. from 1893 to 1897.

FRANK M. NORRIS

Dr. Frank M. Norris, of Fostoria, Ohio, died February 10, 1935, after an illness of three weeks. Dr. Norris was one of the pioneer non-graduate practitioners of Ohio and at the time of his death was one of the oldest practicing veterinarians in that state. He received the second license to practice veterinary medicine in Ohio.

D. D. McNAUGHTON

Dr. D. D. McNaughton, of Devils Lake, N. Dak., died February 16, 1935, of pneumonia, following an illness of a week.

Born at Saint Elmo, Ont., August 31, 1870, Dr. McNaughton attended the Alexandria High School, later entering McGill University for the study of veterinary medicine. He was graduated from the latter institution in 1892. In 1899, he located for practice at Webster, N. Dak., where he remained until 1906, when he removed to Devils Lake. He served as city meat inspector for a number of years. In 1912, he was elected a member of the Ramsey County Board of Commissioners and had served continuously since that time, being Chairman at the time of his death. He had also served on the Federal Relief Board of Ramsey County since its organization, and was a member of the Building Committee for the Memorial Building.

Dr. McNaughton joined the A. V. M. A. in 1903. He was a member of the North Dakota Veterinary Association, of Minnewaukan Lodge No. 21, A. F. & A. M., and also of the Doric Chapter and the Woodmen and Yeomen lodges. Surviving are his

widow(née Mary Elizabeth Webster), one son, one daughter, two sisters and one brother.

L. M. R.

EDWIN HOOKER AGNEW

Dr. Edwin H. Agnew, of Waterman, Ill., died in New Albany, Miss., February 24, 1935, following an emergency operation for an intestinal disorder.

Born April 15, 1893, at Marengo, Ill., Dr. Agnew was graduated from the Chicago Veterinary College with the class of 1915. He practiced first at Oregon, Ill., going from there to Madison, Wis., where he remained until he entered military service. He served with the Veterinary Corps during the World War, having been commissioned a second lieutenant on October 11, 1918, and ordered to report to Camp Greenleaf, Ga., for a course of instruction. He was assigned to the Auxiliary Remount Depot, at Camp Taylor, Ky., on November 9, 1918. Following his discharge from the Army, June 3, 1920, Dr. Agnew continued to practice his profession at Waterman, Ill. Last summer, he accepted an appointment in the U. S. Bureau of Animal Industry and worked in Texas on drouth relief. At the time of his death, he was in Mississippi on tuberculosis eradication.

Dr. Agnew joined the A. V. M. A. in 1924. He was a member of Gamma Chapter of Alpha Psi Fraternity, a Mason, and a member of the Village Board of Waterman. He was prominent in activities of the American Legion of Waterman, and members of the Legion and ex-service men of the Waterman community attended the funeral in a group. Surviving Dr. Agnew are his widow (née Bernice Marston), five children and his father.

JAMES E. SCANLAN

Dr. James E. Scanlan, of Chicago, Ill., died at Tucson, Ariz., February 23, 1935. A graduate of McKillip Veterinary College, class of 1912, Dr. Scanlan practiced at Watseka, Ill., from 1917 to 1922. In the latter year, he removed to Chicago where he continued in practice until his fatal illness.

ROBERT J. BOYLE

Dr. Robert J. Boyle, of Joliet, Ill., died at his home, February 27, 1935, of pneumonia.

Born in Aux Sable Township, Ill., August 8, 1881, Dr. Boyle was educated at the Morris (Ill.) High School and the McKillip

Veterinary College, from which he received his degree in 1913. He practiced first in Chicago, later removing to Joliet. He served as Will County Veterinarian for a time, retiring from that office on September 14, 1933. He was a member of the Du Pontaris Council, Knights of Columbus, of Morris, Ill. Surviving Dr. Boyle are his widow (née Theresa Donahue), two sons, two brothers and two sisters.

JAMES B. JONES

Dr. James B. Jones, of Beverly Hills, Calif., died in California Hospital, March 5, 1935, as the result of a throat ailment.

Born at Raleigh, N. C., February 9, 1901, Dr. Jones attended Maryville College, Maryville, Tenn., before entering upon the study of veterinary medicine at the State College of Washington. Following his graduation from the latter institution in 1926, he practiced for a time at Los Angeles, Calif., leaving there to establish a practice at West Hollywood, Calif. Later, he located at Beverly Hills, where he ministered to the pets of the Hollywood stars until his untimely death. While practicing at West Hollywood, he was associated with his brother, Dr. Eugene C. Jones (Wash. '24).

Dr. Jones joined the A. V. M. A. in 1927. He was a member of Kappa Sigma Fraternity. Surviving are his parents and two brothers.

E. E. J.

C. G. GLENDINNING

Dr. C. G. Glendinning, of Clinton, Ill., died at his home, March 10, 1935, following a paralytic stroke which he suffered while making a professional call three days prior to his death. He never regained consciousness after he was stricken.

Born in Glasgow, Scotland, April 23, 1863, Dr. Glendinning received his early education in the schools of Canada and was graduated from the Ontario Veterinary College in 1889. Following his graduation, he entered active practice in Illinois, locating at Clinton. In June, 1925, he retired from practice and removed to Fort Lauderdale, Fla. Later, he returned to Illinois and, for a time, was located at Decatur, removing later to his old home at Clinton where he again took up the reins of active practice.

Dr. Glendinning joined the A. V. M. A. in 1904. He was the first president of the Clinton Y. M. C. A., serving in that capac-

ity for 20 years. He was still a member of the Board of Directors at the time of his death. He was also chairman of the new Methodist Church Building Committee and chairman of the Board of Trustees. He was a Gold Star member of the Clinton Lodge of Odd Fellows. Surviving Dr. Glendenning are his widow (née Elizabeth Spencer), two brothers and five sisters.

H. A. TAGGART

Dr. H. A. Taggart, of Alexandria, La., died at his home, March 13, 1935, following an illness of three weeks. He was 40 years old.

Following his graduation from the Kansas City Veterinary College in 1915, Dr. Taggart practiced a short time in Missouri and then entered the service of the U. S. Bureau of Animal Industry. At the time of his death he was stationed at Baton Rouge, La. Prior to that, he had been stationed at Jacksonville, Fla., and Jackson, Miss., respectively. He is survived by his widow, one daughter, his mother and two brothers.

ELI CHRISMAN

Dr. Eli Chrisman, of Wadsworth, Ohio, died at the home of his niece in Bluffton, Ind., March 15, 1935. He had been in ill health for some time, and death was due to a complication of diseases.

Born near Sharon Center, Ohio, September 23, 1857, Dr. Chrisman was graduated from the Ontario Veterinary College in 1885. Following his graduation, he located first at Seville, Ohio, and later at Wadsworth where he had practiced for more than 40 years. He was a member of Trinity Evangelical and Reformed Church of Wadsworth. Dr. Chrisman left no immediate survivors.

CHRISTOPHER F. WUELLNER

Dr. C. F. Wuellner, of Alton, Ill., died in Saint John's Hospital, Saint Louis, Mo., March 18, 1935, following a heart attack. He had been ill for the past two years with a heart ailment. He was 45 years old.

Dr. Wuellner was graduated from the Chicago Veterinary College in 1912, and immediately located in Alton for general practice. In this connection, he also operated a small-animal hospital. He was active in his professional career, until ill health brought about his retirement two years ago. He served as an assistant

state veterinarian for 20 years. Dr. Wuellner was highly esteemed in Alton for his kind and understanding treatment of animals. He was noted also as a sportsman, trap-shooter and huntsman.

Dr. Wuellner was a member of Gamma Chapter of Alpha Psi Fraternity. He is survived by his widow (née Jennie I. McCune), two daughters, his mother, three sisters and four brothers.

WILLIAM C. SIEGMUND

Dr. W. C. Siegmund, of Harrisburg, Pa., died suddenly at his home, March 26, 1935.

Born in Baltimore, Md., April 27, 1873, Dr. Siegmund was a graduate of the Baltimore Polytechnic Institute, and of the American Veterinary College, class of 1894. Returning to his native city, he practiced there until 1898 when he entered the service of the U. S. Bureau of Animal Industry. He was assigned to meat inspection in Chicago and remained in that position until 1913. In that year he was transferred to Harrisburg, Pa., and placed in charge of meat inspection there.

Dr. Siegmund first joined the A. V. M. A. in 1895 and remained on the membership list until 1901. He joined again in 1917. He served as resident secretary for Maryland for one term (1895-1896). He was a member of the Twelfth International Veterinary Congress, and also a member of the National Association of B. A. I. Veterinarians. Surviving Dr. Siegmund are his widow (née Emma C. Schwarz), one daughter and one son.

C. C. S.

J. O. YOUNG

Dr. J. O. Young, of Topeka, Kan., died at the Veterans' Hospital, Leavenworth, Kan., March 23, 1935, following a short illness.

Born at Wolf Lake, Ind., August 24, 1872, Dr. Young was graduated from the Kansas City Veterinary College in 1895. He was one of the first graduate veterinarians to practice in Kansas. He located first at Concordia, Kan., later removing to Overbrook, Kan. At the beginning of the Spanish-American War, Dr. Young volunteered as an Army veterinarian. He remained in the service three years, going through the Philippine Insurrection. Following his discharge from the Army, he returned to Topeka where he practiced for 35 years.

Dr. Young joined the A. V. M. A. in 1920. He was a member of the Kansas Veterinary Medical Association. Surviving are his widow, three sisters and three brothers.

A. K.

PERSONALS

MARRIAGE

DR. G. V. CONN (McK. '11), of La Harpe, Ill., to Miss Minnie Dustman, of Dallas City, Ill., at Carthage, Ill., February 6, 1935.

BIRTHS

To DR. and MRS. P. G. BARBER, of Kingston, R. I., a son, Philip Grayson, January 12, 1935.

To DR. and MRS. E. M. DICKINSON, of Corvallis, Ore., a daughter, Bessie Celeste, February 1, 1935.

To DR. and MRS. HENRY P. SCHNEIDER, of Springhouse, Pa., a daughter, Barbara Lynne, February 1, 1935.

To DR. and MRS. J. P. DELAPLANE, of Kingston, R. I., a daughter, Cynthia May, March 16, 1935.

PERSONALS

DR. V. K. JENSEN (Ont. '33) has removed from Woodlake, Minn., to Montevideo, Minn.

DR. R. D. TURK (K. S. C. '33), formerly of Columbus, Kan., is now located at Ash Grove, Mo.

DR. PERCY M. ALDRICH (Wash. '32) has removed from Spokane, Wash., to Wenatchee, Wash.

DR. R. R. CUSACK (Chi. '17), formerly of Carrington, N. Dak., is now located at Jamestown, N. Dak.

DR. JOHN B. HAGENBUCH (U. P. '28) has removed from Lawrenceville, N. J., to Plainsboro, same state.

DR. H. H. RANEY (Iowa '34) reports a change of address from Kingsley, Iowa, to Klemme, Iowa.

DR. H. B. THOMSON (Iowa '19), formerly of Danbury, Iowa, has located for practice at Waukegan, Ill.

DR. M. C. FITZWATER (Gr. Rap. '06) has requested a change of address from Paw Paw, Mich., to Canton, Pa.

DR. E. F. GRAVES (K. S. C. '27), formerly of Madison, Wis., is now located at the State Fur Farm, Paynette, Wis.

DR. W. T. ONSTAD (K. C. V. C. '15), of Clarkfield, Minn., was reported confined to his home by illness during February.

DR. L. B. SWINGLEY (Chi. '09), of Oregon, Ill., had been reappointed to the post of Ogle County Veterinarian for another year.

DR. ERNEST P. SPAETH (U. P. '98), of Gillette, Wyo., is vice-president of the Wyoming State Live Stock and Sanitary Board.

DR. F. B. BATTEN (Ohio '94), of Lexington, Ky., has recovered from his recent serious illness due to double pneumonia.

DR. MELLIS G. TALBERT (Ind. '15) has resumed private practice at Morristown, Ind., after a period of three years spent in state work.

DR. JUDSON H. BINNIG (O. S. U. '34), of Millersburg, Ohio, has accepted a temporary appointment with the U. S. Bureau of Animal Industry.

DR. D. F. STUCK (Ind. '14), who was formerly with the Fostoria Serum Co., Fostoria, Ohio, has opened offices for active practice at Kenton, Ohio.

DR. CARL L. LYNES (Chi. '18), formerly of Chicago, Ill., is now associated with Dr. H. T. Clarno (Chi. '18) in his veterinary practice at LeRoy, Ill.

DR. CARL E. WENDELL (K. S. C. '34), after a brief period of service in the U. S. Bureau of Animal Industry, has located at Vermont, Ill., for general practice.

DR. ED RASH (Iowa '34), of Alta Vista, Iowa, has accepted an appointment with the U. S. Bureau of Animal Industry and has reported at Cheyenne, Wyo.

DR. M. W. OSBORN (Iowa '34) is looking after the practice of Dr. N. A. Kippen (Ont. '97), at Independence, Iowa, while Dr. and Mrs. Kippen are in California.

DR. T. J. LEASURE (K. S. C. '30), of Lawrence, Kan., recently moved to a new location where he has larger and more modern hospital facilities for small animals.

DR. CARL J. NORDEN (K. C. V. C. '11), president of the Norden Laboratories, Lincoln, Neb., spent the month of March in Florida, taking a well-earned vacation.

DR. LOYD E. BOLEY (K. S. C. '32), of Burlingame, Kan., has accepted an appointment with the U. S. Bureau of Animal Industry and has been stationed at Cedar Rapids, Iowa.

DR. J. EDWIN THOMAS (Ont. '07) has removed from Saint Joseph's Priory, Somerset, Ohio, to Lexington, Ohio, where he has established an office at the fairground in that city.

DR. KARL B. HANSON (Mich. '19), of the U. S. Biological Survey, has been located at the Lakeside Ranch of Fromm Bros., Nieman & Co., near Grafton, Wis., since the first of the year.

DR. W. E. FRITZ (Corn. '11), of Silver Creek, N. Y., has a daughter, Geraldine E., studying veterinary medicine at the Ontario Veterinary College this year. She is a first-year student.

DR. R. W. SCHLENKER (K. C. V. C. '10), of Celina, Ohio, has been commissioned a captain in the Veterinary Corps of the Ohio National Guard and has been assigned to the State staff.

DR. HUGH HERRON (Ind. '13), of Watseka, Ill., was a hospital patient in February. He underwent a major operation but has been able to return home and is now reported on the way to recovery.

DR. H. E. ASH (Ont. '15), of Bowling Green, Ohio, recently completed a modernly equipped small-animal hospital and veterinary drug store. Dr. Ash has practiced in Bowling Green for the past 14 years.

DR. W. A. HILLIARD (McGill '97), of the Health of Animals Branch, Canada Department of Agriculture, who has been stationed at Emerson, Man., for many years, has been transferred to Vancouver, B. C.

DR. C. W. GROPE (O. S. U. '32), of Stamm's Lane, Wheeling, W. Va., has been appointed Ohio County Veterinarian, to succeed the late Dr. L. N. Reefer who had served in the post for 25 years.

DR. G. A. JONES (K. C. V. C. '12) is again serving as mayor of Sedro-Woolley, Wash., having been reelected to that office at the 1934 fall elections. Dr. Jones reports times as looking better in his territory.

DR. D. F. PIPER (Chi. '14), who has been doing meat inspection work in East St. Louis, Ill., for the U. S. Bureau of Animal Industry, has returned to Decatur, Ill., where he has reopened his small-animal hospital.

DR. M. F. BELDEN (O. S. U. '33) has returned to his practice at Gallipolis, Ohio, after spending about six months in the employ of the U. S. Bureau of Animal Industry. He was stationed in Cincinnati on meat inspection.

DR. T. O. BOOTH (K. C. V. C. '16), for the past several years in general practice at Temple, Tex., has been appointed chief veterinarian to the Live Stock Sanitary Commission of Texas, which was recently reorganized.

DR. FRANCISCO R. TABERNER (K. S. C. '29), formerly of the Kansas Agricultural Experiment Station, Manhattan, Kan., has accepted an appointment with the U. S. Bureau of Animal Industry and is stationed at Denver, Colo.

DR. T. A. SHIPLEY (Chi. '90), of Rosendale, Mo., and Mrs. Shipley started for Florida last October, but have been delayed by the illness of Mrs. Shipley, who was reported seriously ill in a hospital at Augusta, Ga., early in March.

DR. H. E. KINGMAN (K. C. V. C. '07-McK. '08-K. C. V. C. '09), who was a member of the veterinary faculty of the Colorado Agricultural College for about 25 years, has resigned and is now with the Wyoming Hereford Ranch, Cheyenne, Wyo.

DR. FRED C. PRITCHARD (West. '08), of Tekonsha, Mich., was severely injured in an automobile accident on February 18. He suffered fractures of both arms, a broken knee-cap and severe cuts, when his car collided with another on a curve near Tekonsha.

DR. A. E. ERICKSON (Gr. Rap. '18), of Charlotte, Mich., addressed the members of the Calhoun County Horse Breeders' Association at the annual meeting, February 6. He also gave a demonstration on the treatment of horses for internal parasites.

DR. J. W. PATTON (Tex. '21) of East Lansing, Mich., was interviewed over the radio by Bob Becker, authority on dogs, Sunday, March 10. The broadcast originated in the studio of WGN, Chicago, and Dr. Patton's subject was "Vitamin Requirements of Dogs."

DR. F. E. STILES (McK. '09), of Battle Creek, Mich., is in the midst of repairs on his hospital, which was damaged considerably by fire on January 6. The loss is estimated at about \$2,500. Instruments, drugs and clothing belonging to Dr. Stiles and his associate, Dr. L. A. Walker (Gr. Rap. '18), were destroyed.

DR. S. K. ANDREASSEN (McK. '16), of Menomonie, Wis., addressed the local Rotary Club on December 13 on the subject of "The Eradication of Bang's Disease in Dunn County." Dr. Andreassen gave his address in the form of answers to questions which had been asked him most frequently since the work was started on October 1.

DR. ROBERT S. MACKELLAR (N. Y. C. V. S. '94), president of the American Veterinary Medical Association, was made an honorary member of Gamma Chapter of Omega Tau Sigma Fraternity at Ohio State University, while he was in Columbus, in January, to attend the annual meeting of the Ohio State Veterinary Medical Association.

DR. H. C. GIVENS (U. S. C. V. S. '13), state veterinarian of Virginia, is the author of one of the leading articles in the March issue of the *Southern Planter*. Dr. Givens' article is on "Central Milking Plants," and shows a careful consideration of the subject from all angles. The central plant, according to Dr. Givens, offers a solution to a "lot of future trouble."

DR. WILBUR MCPHERSON (O. S. U. '15), of Lake City, Fla., has been transferred by the U. S. Bureau of Animal Industry to San Juan, Puerto Rico, where he will be in charge of the program for the eradication of tuberculosis and Bang's disease for the Bureau. This work will be conducted in conjunction with similar projects of the Department of Agriculture and Commerce and the Department of Health, of the Island.

